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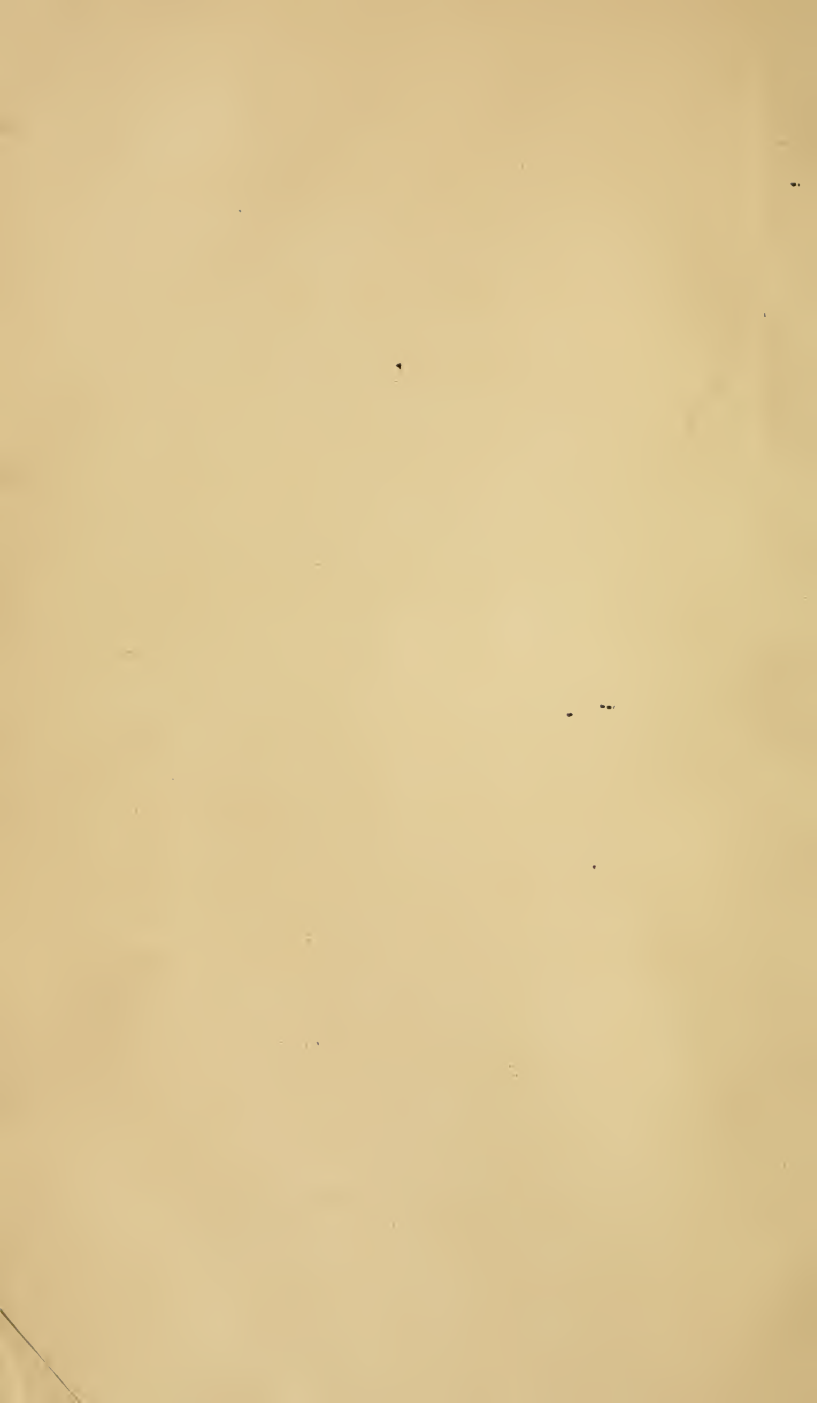
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Walter Channing, M.D.,
Mar. 18, 1856.



A
THIRD DISSERTATION
ON
F E V E R.
PART I.
CONTAINING THE
HISTORY AND METHOD OF TREATMENT
OF A
REGULAR CONTINUED FEVER,
SUPPOSING IT IS LEFT TO PURSUE ITS ORDINARY COURSE.

Medicina igitur adhuc taliter comparata est, ut fuerit magis ostenta quam elaborata; etiam magis elaborata quam amplificata.—BACON, AUG. SC. LIB. II, CAP. I.

Solent autem homines naturam tanquam ex præalta turri & e longo despicere, & circa generalia nimium occupari; quando si descendere placuerit, & ad particularia accedere, resque ipsas attentius & diligentius inspicere, magis vera & utilis fieret comprehensio.—Ibid.

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Walter Channing, M.D.

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Mar. 18. 1856

ORLANDO FURIOSO,

CANT. 35.

XII.

DICO, che come arriva in su la sponda
Del fiume quel prodigo Vecchio, scuote
Il lembo pieno; e nella torbida onda
Tutte lascia cader l'impresse note.
Un numer senza fin se ne profonda,
Ch' un minimo uso aver non se ne puote,
E di cento migliaja, che l' arena
Sul fondo involve, un se ne serva appena.

XIII.

Lungo, e d' intorno quel fiume volando
Givano corvi, ed avidi avoltori,
Mulacchie, e varj augelli, che gridando
Facean discordi strepiti, e romori;
Ed alla preda correan tutti quando
Sparger vedean gli amplissimi tesori;
E chi nel becco, e chi nell' uguna torta
Ne prende, ma lontan poco li porta.

XIV.

Come vogliono alzar per l' aria i voli,
Non han poi forza, che 'l peso sostegna,
Sì che convien che Lete pure involi
De' ricchi nomi la memoria degna.
Fra tanti augelli son duo cigni soli
Bianchi, Signor, come è la vostra insegna,
Che vengon lieti riportando in bocca
Sicuramente il nome, che lor tocca.

XV.

Così contra i pensieri empj, e maligni
 Del Vecchio, che donar li vorria al fiume,
 Alcun ne falvan gli augelli benigni;
 Tutto l' avanzo obblivion consume.
 Or se ne van notando i sacri Cigni,
 Ed or per l' aria battendo le piume,
 Fin che presso alla ripa del fiume empio
 Trovano un colle, e sopra il colle un Tempio.

XVI.

All' Immortalitade il luogo è sacro,
 Ove una bella Ninfa giù del colle
 Viene alla ripa del Leteo lavacro,
 E di bocca dei Cigni i nomi tolle;
 E quegli affigge intorno al simulacro,
 Che in mezzo il Tempio una colonna estolle:
 Quivi li sacra, e ne fa tal governo,
 Che vi si pon veder tutti in eterno.

A

THIRD DISSERTATION, &c.

AN ephemera, or fever consisting of one paroxysm only, or, in other words, of a cold fit, hot fit, and crisis, is easily distinguished from any other disease; nor is it difficult to distinguish an intermitting fever, if regular, as it consists of several paroxysms, similar in all their parts to the one paroxysm of an ephemera. But a fever going on for many days without any appearance of crisis; having only one marked crisis after a continuance of two or three weeks, or perhaps going off without any marked crisis, is with difficulty distinguished from many other diseases.

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This seems to be the principal cause of the confusion found in the works of even practical authors, who have treated on this disease. Should the author also fail in discriminating it, he will have this consolation, that he has failed with many of the first practitioners who have written on this subject.

A fever which continues for three, four, five weeks, or even longer, without any marked crisis, and afterwards goes off by degrees, one critical symptom happening after another, is only, in the author's opinion, a repetition of ephemeræ, where the subsequent paroxysm begins before the crisis of the former has begun to take place.

It has been shewn, in the Treatise on a regular tertian, that at the beginning of the disease the succeeding paroxysm often commences before the beginning of the crisis of the preceding one: were this to continue to the end of the disease, it would be a continued fever. It has also been noticed, that

that if one very perfect crisis should take place, it sometimes terminates an intermittent; but that when the disease is not so carried off, it gradually diminishes after a certain time, and ceases entirely.

A regular continued fever begins in the same manner, increases for a certain time, remains nearly in the same degree for some time, diminishes from no apparent cause, and leaves the patient. Or otherwise, a crisis takes place during some part of its progress, either carrying it off altogether, or converting it into an intermittent.

A fever is a disease of the whole system. If a disease of a part, therefore, should go off while the cause remains, and the system should not be generally affected in a greater or less degree, it ought not to be considered as fever.

One criterion of a regular continued fever is, that it increases for a certain time from its beginning, remains for some time in its greatest degree, or as the Greeks call it acme, then, without any apparent cause,

gradually diminishes, and terminates in health. Or otherwise, a crisis takes place during its progress, and carries off the disease; or the crisis converts it into an intermittent; or otherwise in its progress it produces topical inflammation; or kills the patient. Any disease, not having these qualities, is not a regular continued fever.

The author has before remarked, that when a cause is applied which produces fever, it produces it *uno ictu*, at a blow; and the disease continues afterwards, although the cause be no longer applied; neither is it increased, diminished, or altered by the farther application of its cause. The author, therefore, would not admit any affection of the general system to be a fever, which depends upon the constant application of the original cause.

Should a disease arise with frequency of the pulse, and other affections of the whole system; but if these general affections should not be such as are commonly found in fever; that is, if there should not be contraction

traction of the vessels, depression of strength, affection of the stomach, &c. although the disease should arise from a cause, the continuance of which is not necessary for the continuance of the disease, and the disease should gradually increase, remain for some time with a certain degree of violence, then gradually diminish and go off, nevertheless it must not be considered as fever.

The following rules may be applied for distinguishing the several diseases which have been called fever from that disease.

When the disease has a tendency, after having increased to a certain degree, gradually to diminish, and go off without any apparent cause.

This is a property of fevers, but not of fevers only. Acute rheumatism, when no medicine whatever is exhibited, increases for a certain length of time, rises to a certain height, continues for a time in an equal degree, then gradually abates and leaves the patient. Hemicrania encreases for a time,

then continues in the same state, although a much longer time than acute rheumatism, and afterwards leaves the patient without any apparent cause whatever, seeming only (if the expression may be used) to grow tired of a longer stay. Some cause, however, there must be for all such increase and diminution, although it has not yet been discovered.

This criterion of fever, therefore, is unfit for universal application; but it may be applied in many cases; as for distinguishing the disease called hectic fever. This disease sometimes agrees with regular continued fever, in arising without apparent cause; but it commonly arises from, and is kept up by the constant application of an apparent cause. There is coldness, paleness, and other symptoms of depression of strength and contraction of the small vessels: these are followed by heat, frequency of the pulse, foulness of the tongue, and other symptoms of the hot fit of fever. The attacks and subsequent apparent hot fits take place in the evening, terminating

minating in the morning, often with several critical symptoms. Sometimes indeed the attack happens in the day-time, but not commonly. This disease has been frequently called fever, but it wants this essential property, that where it does not arise from an apparent cause, and often when its cause is removed, it has no disposition to go off of itself, but remains until it destroys the patient. This want of means of curing itself excludes it from the class of fevers.

In tetanus contraction often takes place in the muscles of various parts of the body, continuing for a certain length of time, without any apparent intermediate relaxation; the general system is often affected, the pulse becomes frequent to a hundred and twenty strokes in a minute or more: there is, however, no other appearance of fever in the system; the patient is often in a profuse sweat, the tongue is clean, and the stomach not much affected. This affection of the system often arises without any apparent cause, and frequently after some other disease has gone off, as after the cure of a

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fever,

fever, or the healing of an ulcer ; it increases to a certain degree, continues for a certain length of time, diminishes, and goes off.

The same affection of the system arises not uncommonly with little or without any spasmodic contraction of any of the muscles of the body. Although this case has not been remarked by any writer the author is acquainted with, yet he has seen it several times. First, where there has been spasmodic contraction in particular parts of the body, the affection of the system has been greater than in proportion to such spasmodic contraction. Secondly, when there has been no spasm in any part, and therefore the affection of the system subsists without any continued cause applied. This affection cannot be called fever, because it totally disagrees with it in its appearances.

Should a phlegmonous inflammation arise in any part of the body of a strong young person, distending the part considerably, and accompanied with violent pain ; as the inflammation increases, the pulse becomes hard, full, strong, frequent and synchronous ;

chronous ; considerable degree of heat and of general tension takes place all over the body ; the tongue is covered with white fur, the patient has head-ach, feeling as if his head would burst ; pains in the extremities, and great sense of heat : these appearances gradually subside, when the phlegmonous inflammation has suppured, and the pus has made its exit externally ; they are therefore kept up only by a constant apparent cause, and are consequently excluded from fevers ; or should the inflammation be cured by any means, this affection of the system also goes off in the same manner, so that the affection of the system evidently depends on the topical affection, and therefore is not fever.

Should rheumatism arise in any part of the body, all the appearances in the system just enumerated take place, and continue often as long as the rheumatic affection continues in any part, or parts of the body. But when the rheumatic affection has gone off, these appearances gradually subside also, and leave the patient. Sometimes, when the rheumatism is not in fact cured, but has
left

left the patient in appearance free from disease, after a short pause a metastasis takes place to the head or breast, and soon proves fatal. This remission of the symptoms is nothing like an intermission of fever, for which reason it is here noticed.

Similar appearances take place in the system in the gout, and in other diseases which depend entirely upon their apparent cause; increasing as that cause increases, diminishing when it diminishes, and going off when it is removed.

These appearances have often been called inflammatory fever, or general inflammation, but are excluded from the class of fevers by their dependance upon their cause.

Should erysipelatous inflammation arise on the skin, it often happens, after the inflammation has taken place, that the pulse becomes frequent to 120 strokes in a minute or upwards; the strength of the patient is universally depressed, there is head-ach, foulness of the tongue, loss of appetite, nausea; the sense of heat is very much increased, as also the degree of heat to 100° ,
or

or 103° , or 104° ; there is dryness of the skin, and obstruction of the pulse. These symptoms are all very much increased in the evening; and there is some degree of relaxation of them in the morning. This disease is extremely similar to fever, yet it is to be excluded from that disease by its total dependance upon its cause, the erysepelalous inflammation of the skin; for if that be removed by application of alkohol, diluted with water, to the inflamed part only, all these affections of the system generally go off.

Should an erysepelalous inflammation arise in the throat, producing whitish sloughs in it, similar symptoms appear in the system; but if the inflammation be carried off by the exhibition of large quantities of the bark of the cinchona, and the whitish sloughs be made to fall off, so that all disease shall be removed from the mucous membrane of the throat, the affection of the system generally ceases. This affection of the system, therefore, cannot be ranked among fevers, according to the rule, which excludes from fevers diseases

depending on the constant application of their cause.

Should phlegmonous inflammation take place in any part of the duodenum, jejunum or ilium ; and after the inflammation has taken place, as shewn by the pain, if the strength be greatly depressed, if the pulse should become hard, frequent to 120 strokes in a minute or upwards, and much contracted ; if there should be a thick brown fur upon the tongue, great sense of heat, head-ach, paleness, and contraction of the skin, nausea and vomiting ; if there should even be delirium ; let the inflammation of the intestines be cured by copious bleeding from the arm and skin of the abdomen, by the application of sedative and relaxing fomentations to the abdomen ; all these symptoms in the system generally will subside and go off, and therefore cannot form a disease which ought to be included in the class of fevers.

In treating of the ephemera it has been observed, that in the middle of the hot fit a
topical

topical inflammation sometimes arises and carries off the fever. Thus, for example, in an hour or two after all the appearances of a paroxysm of fever have taken place, a pain arises in the side a little below the clavicle. The pulse either was, before the pain in the side took place, or becomes afterwards, very hard, full, and strong, accompanied with difficulty of breathing, increased pain of the side on inspiration, and all the other appearances, which would have arisen had a phlegmonous inflammation taken place in the pleura without any preceding cold or hot fit. In the latter case, if large evacuations be made by bleeding from the arm and skin of the breast, the inflammation of the pleura is carried off, and every morbid affection of the system ceases in consequence; but it sometimes happens that the inflammation being carried off from the pleura, that is the pain having left the side, and the difficulty of breathing having ceased, the frequency of pulse, heat, and all the other symptoms of fever remain notwithstanding, and go through the course of a regular continued fever. This case the author finds a
 difficulty

difficulty in discriminating; but he conceives that an ephemera had taken place in the first instance; that the inflammation of the pleura had cured this ephemera; that the inflammation being carried off by the evacuation, or other remedies, no fever remained in those cases where the symptoms entirely ceased on the cessation of the inflammation; but that when the febrile symptoms continued after the pleurisy was cured, a regular continued fever had been diminished by the inflammation of the pleura, but not entirely carried off; that therefore when the pleurisy was cured, the fever went on as it would have done if no such inflammation had happened.

It may be said, that it were more simple to consider all these affections of the system as fever; but it has been always thought, that in scientific subjects nice distinctions should be made where they actually exist, in order to discriminate the natural properties of bodies. In botany, for example, a superficial observer would rank together all beautiful and sweet-scented plants under the
name

name of flowers ; all plants whose seed gives nourishment to mankind, under the name of grain ; all plants whose leaves, stems or roots are eatable, under the name of pot-herbs, and reckon all others weeds ; while the botanist would carefully distinguish between the figures and qualities of plants similar to each other in any one respect. Some consider all noises the same ; a musician carefully distinguishes a semitone. Were diseases studied merely to investigate their properties, it would still be worth while to enter into accurate and minute distinctions ; but they become of much greater moment when the object is to alleviate and remove the disease.

One object in view in laying down the above distinctions, is to discriminate between diseases where it is only necessary to remove their cause to cure the patient, and those where other circumstances of the disease are of moment.

In what is called hectic fever, which continues often after its cause is removed, as it
does

does not produce any means of its own cure, some must be employed to carry off the disease, without attention to its own ordinary progress.

If a disease depends solely upon its cause, it is sufficient to remove that cause, and in general attention to the disease itself is unnecessary. Should a phlegmonous inflammation produce the appearances similar to those of a paroxysm of fever, medicines are to be employed that will carry off the topical inflammation without attending to the general affection of the system, excepting that this general affection must sometimes be considered as an accident that may in itself be mischievous. Where phlegmonous inflammation cannot be cured, if it should not prove fatal, from affecting some organ necessary for life, the inflammation must be allowed to suppurate, and the suppuration must even be forwarded very frequently by means increasing the general affection of the system, instead of employing medicines to diminish or remove it. Whereas in fever, on the other hand, the whole attention is directed

rected to the application of remedies that will either remove the disease, or make it go through its natural course without danger to the patient, or with a less degree than it otherwise would, totally neglecting the cause which first produced it.

General inflammation excited by a disease affecting some part necessary for life, might however be fatal, independent of the topical inflammation which occasioned it. In this case it would be necessary to employ means to take off the general inflammation; but they are commonly the same as those which take off the topical inflammation, and totally different from those that should be employed to take off fever.

When rheumatism excites general inflammation, the general inflammation frequently appears to be the principal disease; and until lately practitioners have thought it ought to be carried off by large evacuations, especially by bleeding. Dr. Hugh Smith, an extraordinary practitioner, conceived that the evening attacks of violent pain, frequently

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happening

happening in acute rheumatism, were the returns of the paroxysms of an intermittent. He therefore exhibited the bark of the cinchona, in the quantity of an ounce and an half, during the interval of the pain, although the pulse continued hard, full, strong and frequent, and thus succeeded in preventing the return of the pain. This practice has since been adopted with success by many practitioners. Some have even employed the bark of the cinchona in acute rheumatism, where there was no remission of pain, but in the cases the author has seen, without effect. While it was the practice to remove the general inflammation by bleeding, metastasis frequently took place to the interior parts of the body, and destroyed the patient. This accident in the author's practice during the last fifteen years has rarely happened. In this period he has entirely left off bleeding in acute rheumatism; and has not lost above two or three patients, although he has treated several hundreds in this disease. This may be considered as a digression; but it is intended to shew, that general inflam-

inflammation, in this case, has nothing in its treatment similar to fever.

If in the gout, or in other diseases where general inflammation takes place, unless it were so violent as immediately to threaten the destruction of the patient, large evacuations by bleeding certainly should not be made, nor any means be employed to carry it off, which would increase the original disease. In managing the gout, or other such diseases, in the best manner, remedies must sometimes be employed which evidently tend to increase the general inflammation.

If in consequence of an erysepelalous inflammation of the skin the pulse should become frequent to 120 strokes in a minute, or upwards, there should be universal depression of strength, and other symptoms of general affection of the system, they ought not to be attended to, but solely the erysepelalous inflammation of the skin, as on the cure of that, the affection of the system would cease.

In erysepelatous inflammation of the throat, producing whitish sloughs in it, the general affection of the system is not to be attended to; but the practitioner should endeavour to carry off the erysepelatous inflammation and remove the sloughs, without attending to the frequency of pulse, heat, or any part of the affection of the system generally.

If from inflammation of the duodenum, jejunum or ilium, there should arise great depression of strength, frequency and smallness of the pulse, with other symptoms of general affection of the system, an experienced practitioner would not employ cordials, or peruvian bark, to support or increase the strength; nor would he attend at all to the general affection of the system, but would endeavour to cure the inflammation in the intestine, without paying the least attention to the general affection of the system.

If an attack should take place similar to the attack of an ephemera, and violent pain should arise in the side, a little under the clavicle,

clavicle, increasing upon inspiration, the pulse becoming hard, full and strong, and other symptoms of general inflammation taking place; if by making large evacuations by bleeding from the arm and skin of the breast, by blisters and other remedies, the pain should be entirely removed from the side; if notwithstanding the general affection of the system should not go off, that general affection is then undoubtedly to be attended to. If, during the existence of the pleurisy a practitioner is enabled to determine, that although the pleurisy should be carried off, the affection of the system would still remain, in this case the general affection is to be attended to, both during the pleurisy and after it is carried off. These distinctions, however important, have hardly ever been made matter of enquiry.

A regular continued fever takes place exactly in the manner of an ephemera, or a regular tertian; nor would it be possible, from the appearances of the disease, to determine whether it would be an ephemera simplex, a regular tertian, or a regular con-

tinued fever. The circumstance of a patient's living in a country, where intermittents were endemic, from moisture or putrefaction, arising in marshy grounds, in warm climates; or of intermittents being from any cause epidemic in dry countries, might make a practitioner suspect that the disease would be an intermittent or remitting fever. But without such circumstances, no appearance in the patient himself would, within two or three hours of the attack, at all enable him to determine what kind of fever it would prove.

Continued fevers sometimes then begin at once exactly with the same symptoms as an ephemera. At times, however, there arises immediately upon application of the cause of disease, particularly if it should be exposure to cold, putrefaction, or infection, some derangement of the system, but no complete paroxysm of fever. These derangements consist of languor, the patient's feeling himself not perfectly well, and being unable to exert the powers of his body or his mind, whether for business or amusement, so perfectly

fectly as when in absolute health. Sometimes his sleep is disturbed; he does not go to sleep readily; his sleep during the night is broken, and he is not refreshed so much as usual. It happens sometimes that these symptoms go off in a few days; sometimes they all at once increase very considerably, and form a paroxysm, which is the beginning of the fever.

The state of sleep has been variously represented by writers upon it, whether physicians or metaphysicians. The effects of sleep in fever, and particularly in continued fever, are so great, that it may be necessary for the author to state his ideas on the subject.

Whence or how the powers of exertion, and the various operations, either of the body or mind, are produced, it is impossible to say: or at least every thing that has hitherto been said on the subject is visionary.

It has already been observed, that the power exerted by the muscles is not de-

rived from any mechanical or chemical construction or operation, but that it is an original power arising from the life of the animal. This power may be infinite, so that all the muscles may be able to exert themselves constantly with an infinite force; or it may be finite, and so that the muscles of the body may act altogether with a certain force, and constantly continue that force of action; or a certain number of muscles may exert all the force of the body, the others being at the same time necessarily at rest.

We find by experience that the force is not infinite, and that only a certain quantity of it can be exerted in a given time. It may be exerted either in all the muscles at once, or in a certain number of them, the remainder being at rest: for no man can lift above a certain weight, therefore the force is not infinite. A man cannot run with velocity, and strike at the same time an equal number of blows of equal force with a man keeping the muscles of his lower extremities at rest.

A man

A man might be able, either to exert his utmost muscular force constantly, or it might be necessary for him to come to rest, after having continued to exert his utmost muscular force a certain time, and to remain some time at rest before he could again exert it. The latter of which is known to be the case; that is, when a man has exhausted himself by labour, it is necessary that he should be recruited by rest.

The rest from muscular exertion is not, however, absolute rest; for there are some of the muscular exertions of the body which must always be carried on, in order that a man should live. It is necessary, for example, that the muscles of the organs of respiration should continue to expel vapours from the lungs, as they become unfit for the purposes of life, and draw in fresh vapours, otherwise the life would be lost; that the heart and arteries should be in constant action; that such muscular powers as form the tone of all the moving parts of the body should be constantly exerted, &c. The body
may

may be compared to a machine, moved by a stream of water always sufficient to keep some parts of the machine in action, but not the whole. If a dam be formed, leaving an outlet for part of the water sufficient to keep certain necessary parts of the machine in constant action, the remainder may be retained for a time, when on opening a sluice the water treasured up will set the whole machine in motion, and continue its action until the dam is emptied.

After a man has been at rest for a certain time, it is not necessary that he should exert the power he has re-acquired ; he may if he pleases continue in a certain degree at rest.

In fever, not only the body is affected, but often the mind also. It may, therefore, be necessary to make some investigation of the powers of the mind. It is, however, by no means intended to treat of the powers of the mind, or its properties, as they relate to diseases of the mind, but only in so far as they are connected with diseases of the body, particularly with fever.

The

The powers of the mind are, 1st. perception ; that is, the power of receiving impressions from the organs of sensation.

The organs of sensation are of a particular construction, by which some alteration is produced in them by external objects. The eye, for example, the organ whose operation is in this respect most evident, has a membrane in it called the retina, upon which the image of an external object is painted, by the lenses of the eye ; so far the body contributes to the idea formed in the mind by an external object, and so far the perception is in the body. Any thing in the body which prevents an object being painted on the retina, or painted with sufficient perfection on the retina, may be considered as a disease in the body preventing the perception of an external object. Supposing the object is perfectly painted upon the retina, yet, frequently, no impression is made upon the mind, and no idea whatever is excited. This may happen without any disease of the mind, merely from its attention being withdrawn to something else.

The

The tree in St. Paul's church-yard has been painted perfectly on the retina of millions of people, without exciting any idea in the mind, so much so as to be a common topic of jest books. This perception then must be considered as an operation of the mind entirely separate from the painting of the object on the retina.

The second operation of the mind is memory, the power of recalling ideas which have been formed by impressions made on some of the organs of sense, and it is certainly an operation of the mind alone.

Imagination, or the power of arranging ideas in various ways, has likewise been considered as purely an operation of the mind.

Lastly judgment, or the power of determining whether ideas are properly arranged, and according to their original perception. The judgment, for example, would revolt, on having presented to it by the imagination a cow with an horse's head, or St. Paul's church placed in Pekin.

All these exertions of the mind are exertions of a certain power, but that power seems at first sight to be totally different from the muscular power of the body ; yet there is certainly this connection between them, that if the body has been fatigued with exercise, the mind cannot exert its powers of judgment, nor carry on any process by which it may determine the congruity of ideas. A student in mathematics, having once acquired the knowledge subservient to the demonstration of a problem, would not be able, after having contended in an athletic game, to trace the steps by which the problem was demonstrated.

On the other hand, a mathematician, after having gone through a new and laborious demonstration, would be unable to exert the powers of his body in a fox chase.

Whether, therefore, it be the same power employed in the exertions of the muscles and the mind, or different powers, yet these powers are so connected together, that the exertion of the one will pre-

vent the possibility of exerting the other in so great a degree as it might have been had there been no immediately previous exertion of either.

The powers of the mind, like the muscular power of the body, are not infinite. A man cannot perceive, remember, imagine, and judge of an infinite quantity of subjects at the same instant; he must indeed first perceive, then remember, then imagine, and then judge. Neither can the imagination arrange an infinite number of different ideas at the same instant, nor the judgment determine whether they are properly arranged, nor the memory bring up at once all the ideas it has in store, nor perception produce an infinite number of ideas at once. Hence it is evident, that the powers of the mind are no more infinite than the powers of the body.

The mind having exerted any one of its faculties for a certain length of time, can no more continue the exertion of that faculty, than a muscle, not necessary for
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the immediate purposes of life, can continue its motion. This beyond a certain period renders it necessary, after the exertion of any of the faculties of the mind, that that faculty be allowed to rest some time before it is again exerted.

If the powers of the mind be exhausted by the exertion of any one faculty, no other faculty of the mind can be exerted till after rest.

In all these respects the force of the muscles, and the powers of the exertion of the mind, are perfectly similar to one another. There is one thing indeed which has been disputed by metaphysicians, whether there be any exertion of the mind absolutely necessary for its existence, as the respiration and the action of the heart are necessary for the existence of the body. It is not our present purpose to enquire into this; all that is to be said is, that we do not know, either *a priori*, or from experience, that is, from reflexion on the faculties of our own minds, that it is necessary that the mind
should

should perceive, remember, arrange, or judge of any set of ideas in order to exist.

Upon the whole, therefore, in order to exert the powers of the body and the mind in their full force, it is necessary that there should be intervals of rest. The author conceives that sleep is this rest, sometimes more sometimes less perfect; for in sleep we shall, in the first place, consider the exertions of the mind. The judgment, which is the most exhausting operation of the mind, is totally at rest. Supposing even that the patient should dream, that is to say, that the memory should present certain ideas, and the imagination arrange them, the judgment never exerts its powers at all. The mind never revolts at a cow with an horse's head, nor the town of Pekin surrounding St. Paul's; nor whether St. Paul's is placed upon its base or turned topsy turvy, and reeling upon its cross. Imagination is left to go on freely in a dream without correction from the judgment. This is therefore certainly a great degree of rest of the greatest exertion of the mind. Although

though it frequently happens in sleep, that the memory and imagination are employed; or in other words, when a man dreams, it seems clear that they are at rest in a certain degree. If a man attends to what happens to him in a dream, he feels often that he has lost himself entirely, as if the memory produced no connected series of ideas, but flew from one object, and apparently from one period of time, to another; he is totally lost, and wonders that he has found himself again. That constant connexion of ideas, therefore, which takes place when a man is awake, does not exist in sleep. The memory, then, and the imagination do not exert themselves so much in sleep, and so constantly, as when a man is awake. Without entering into the controversy, whether the memory and imagination are ever totally at rest, the powers of perception in the mind are certainly, in many cases of sleep, totally at rest, without any defect in the organs or the exertions of the body. It is very true, as has been already observed, that the exertions of the body are often such as put parts of it in

those situations in which the mind can take perceptions from it. The muscles of the eye for perception must exert themselves so, as to give the lenses the proper convexity to paint objects, which are at different distances, correctly on the retina. Therefore, should a man sleep in day-light with his eyes open, which has happened in a great number of cases, the mind could not receive perceptions, which are distinct, of objects which are at various distances. The lenses of the eye would certainly paint objects at a given distance very perfectly; but the mind would receive no idea from such painting. Therefore the mind, while a man is asleep, is at rest, so far as regards the power of perception.

Here then two exertions of the mind, in tolerably sound sleep, are entirely at rest; the power of receiving ideas from impressions from the body, and the power of judging whether the imagination has properly arranged the ideas that may be represented to it. There is certainly likewise a diminution of the powers of the memory, in presenting

senting ideas to the imagination, although perhaps not equally a diminution of the powers of the imagination in arranging such ideas, which, without the correction of the judgment, would arrange them, as the wind blows, as it listeth. There are perhaps too (as has been contended by some metaphysicians) cases in which the memory presents no ideas to the imagination, which of course can make no arrangement of them, so that the mind is perfectly at rest. In a certain degree of sleep, the mind perhaps neither receives any impression from any external object, nor has any ideas brought up into it, of course no ideas can be arranged; therefore arrangement cannot be judged of, or, in common expression, a man does not dream at all, according to some metaphysicians. This happens, we may say almost undoubtedly, in fainting fits, fits of epilepsy, hysteric fits, &c. where it was never known that any person, after coming out of them, ever remembered any dream at all. If in sleep, therefore, the mind is not at perfect rest, it is certainly at rest in a very great degree.

It has been already said, that the body cannot exert itself always, but must come to rest. The next enquiry, therefore, is, how far the body is at rest during sleep more than it is at any time while a man is awake. The first thing, in which the different states are to be compared, is the power of giving perceptions to the mind. The eye is that organ, in which the power of the body in giving perceptions to the mind has been most completely discovered, although perhaps not quite completely. It admits rays of light ; it collects them, and applies them to the retina, through transparent lenses, so as to paint there an image similar to the body, from which those rays of light were emitted. In sleep, then, the eye-lids are generally shut, so as to prevent the rays from falling upon the retina at all ; or at least the eye-lids are so opaque, as not to allow the rays to fall upon the retina, so as to paint any image at all ; therefore the power of perception in the body is, in this case, suspended and at rest. The author might say that, from analogy, the same thing probably happens in all the other organs

gans of the senses, and that they also are at rest ; but he does not think that any truth can be deduced from analogy. It must depend only on future experience to determine, whether the sensibility, or power of impressing an idea on the mind by any of the other organs of sensation, is equally suspended in sleep as the power of the eye.

In tolerable sleep, therefore, the action of the body, which makes the impression on the mind, if not totally at rest, is much more at rest than when the body is awake.

When a man goes to sleep, as he does when not prevented by any external accident, he puts himself in a recumbent posture, which is not a posture he commonly assumes when awake. In this position, in the first place, he is supported by a great many more points than when standing, sitting, or walking ; therefore more points being pressed upon, it requires less exertion to avoid the effects of such pressure. It is true, however, that the exertion might be equal, although it does not seem to the feel-

ing to be so. In the next place, if a man is in an erect posture, it requires the exertion of a great number of muscles to keep up the equilibrium necessary for that posture, while no such exertion is required in a recumbent posture, every part of the body throwing itself in that situation, in which its gravity would place it. So far, therefore, the body is more at rest when a man is asleep than when he is awake. Moreover it is well known, that what is habitual is performed with great ease ; whereas going out of the habit requires a very considerable degree of exertion. Now the foetus in the womb is laid with its body bent, its knees brought towards the chin, and its arms folded. A man in health rather lies, therefore, in this posture, which he has acquired by habit, than exert himself against that habit ; so far again he is at rest in sleep. It is true that lying in this posture requires some muscular exertion, and so we see that those who have been reduced to a great degree of weakness lie, even when awake, upon their back, where there is hardly any muscular exertion at all. This,
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being contrary to their habit, produces a certain degree of uneasiness, which occasions an attempt to shift their posture, which being made by the muscles of the back, they are constantly throwing themselves towards the bottom of the bed. What has been just said shews that in sleep there is a great degree of rest from muscular action.

Again, the heat of the body is produced by the action of the living power. It is very true that almost every body, excepting Dr. Cullen, has attributed the heat of the body to some of the means of producing heat out of a living body: it would be a digression greatly too long to enter into at present, to state the arguments on this question here. If the opinion be wrong, that it does depend upon the living power, it will affect the present argument but very little, it being at present only intended to state a fact, to wit, that although the heat of the body to the thermometer be the same in a man sleeping or awake, yet when a man is asleep, he cannot communicate so much heat to the surrounding medium as when he

is awake. This is evident by the experience of every man, who falls asleep with the ordinary clothing which he wears when awake ; waking again, he feels extremely cold ; that is, he feels the substances that surround him very cold.

Although the heart continues its action when a man is asleep as well as awake, yet during sleep it happens very often that the pulse, the measure of the action of the heart, is neither so frequent, so full, nor so strong as when a man is awake. Moreover, the breathing does not go on so quickly, nor the peristaltic motion of the intestines in the same degree, nor any of the other actions necessary for life. Thus, although there is not a total rest in those actions of the body, which must constantly take place in order to its existence, yet the body does not exert itself in the same degree.

In sleep, therefore, the judgment is often totally at rest ; perhaps the memory and imagination are sometimes also totally at rest ; the power of perception in the mind is certainly sometimes totally at rest ; the state of the
body,

body, which gives the mind a means of perception, is also in some instances, perhaps in all, totally at rest: the muscular exertions, not necessary for life, are totally at rest, excepting where habit has made it more easy for certain exertions to take place; and lastly, the muscular powers of the body, which are necessary for life, act with less vigour. Sleep, therefore, may be considered a state of rest, during which the powers of the system are recruited; or, to go on with the simile first begun with, the dam is shut up, so that the waters accumulate in it, and are ready to be applied, to bring the whole of the machine into action.

The only apparent objection to this view of sleep is, that people in madness, in many instances, never sleep; but then the author would contend that they are never awake. Their judgment, that which is the greatest exertion of the power of the system, is never at all exerted in maniacs who never sleep. The imagination may arrange the ideas that the memory presents to it, without the judgment ever attempting to disturb it.

it. The power of perception in their mind is undoubtedly perfectly confused; a crown of straw, or even a single straw, painted on the retina, excites the idea of a crown of gold adorned with jewels; a single straw the idea of a circle, and not of a line. The power of impressions on the body is much less; it requires several times the dose of a purgative, or of any other medicine, to produce an equivalent effect. The common stream of power flowing into the body, if we may so speak, may be sufficient to keep up such a degree of action, as has just been described, constantly, but not the actions which take place in a person whose faculties are sound.

The next thing to be inquired into is the effects of sleep.

Having shewn that the actions of the mind are very considerably at rest in sleep, if not sometimes totally, and that the exertions of the powers of the body are also in a great degree of inaction; if a quantity of living power be constantly generating in the system, it follows that in sleep this power will be gradually accumulated, as the
water

water would be in a dam, if a constant small stream were flowing into it, and only a part of that stream flowing out. The dam being filled, the water flowing over would set some of the parts of the machine at work, which might raise the sluices of the dam, and put the whole of the machine in motion. Thus in the system, when a quantity of power is accumulated, part of the exertions may take place, as we see is the case in natural sleep. A man in health, and not much fatigued, first falls into a reverie, and then into sleep, which at the beginning is accompanied with dreams, afterwards becomes more profound, until sometimes it becomes perfect, perhaps without any dream, and the person is with difficulty awaked and excited into action. After a time of such profound sleep, he begins again to dream; all his powers are brought into action with great facility if any stimulus be applied; otherwise they come into action, and the person awakes, without any stimulus being applied, as it were from the system being full of power.

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If the subject be viewed in this light, it will appear, that sleep is simply that rest, which is necessary to recruit the powers of the body and the mind, when they are exhausted; and that in the common and healthy state of the body, when there is the ordinary exertion, sleep is necessary, after a certain interval, to restore the powers of the system, so as to enable them to exert themselves.

Want of sleep, therefore, will prevent the necessary accumulation of the powers of the body, and consequently induce weakness, or the want of sufficient power in the system to exert itself to any great degree. A continual want of sleep, if the exertions take place, as when a man is awake, will at last, and does actually, so exhaust the system, as to deprive a man of all power of action whatever, so that he shall no longer exist.

Sometimes want of sleep for a certain length of time produces mania, a state of the system which it is not our business here to inquire into. It may be sufficient to observe,

observe, that we cannot pretend to determine *a priori* any thing with regard to what would happen to animals. Mania is a state of the system that no man could have imagined if it had never actually taken place.

Supposing the system is weakened by the want of sleep, and that mania does not take place, we are next to take notice of what happens, when the weakness is not so great as to destroy the patient.

If any machine be made on mechanical principles, so as at once to perform many actions independent of one another, and a force be applied to put that machine in motion, so that it shall perform all its functions; if that force be diminished, some of its functions may cease entirely, and the others go on regularly. Suppose that we had a time-piece, in which the motion of the parts keeping time should be produced or continued by any power, and that this power was more than sufficient to produce the motions keeping time. The superfluous
power

power may be employed to occasion another action, such as the pumping of water, to which it is actually applied. That machine might be so constructed, that the primary power shall be sufficient to keep up the motion of the time-piece and something more, but the power might be diminished so as not to be more than sufficient: in that case it would cease to act upon the pump, so that the motion of the time-keeper might continue, without the motion of the pump. Or otherwise, a mechanical machine might be so contrived, as that the power originally generating motion should act equally in producing all its motions; in that case, if the original power was diminished, all its motions would be diminished equally. Neither of these is the case in the human body, when the power which actuates it is diminished for want of sleep, or by any other means. Some of its actions do not cease while others go on, nor are they all equally diminished; but the whole of its actions become irregular. While some of them diminish, others increase, indiscriminately; that is, it is uncertain which will increase and which diminish. Want of sleep,

sleep, therefore, produces irregularity in the whole actions of the body, and great irregularity in fever. So does also any other cause diminishing the powers of the body, but not nearly so much as want of sleep.

For example, if a man in health should be prevented from sleeping during a whole night, little more would happen, than that all the powers of the body and mind would be somewhat diminished. He would not be able to make such great exertions in walking and riding; nor would he exert the muscular actions of the interior parts of the body in so great a degree. The powers of his perception, as far as depended on the body, would not be so complete. For example, he would not be able to adapt his eye so exactly to the distance of an object, as that it should be painted perfectly on the retina; the mind would take less readily or perfectly the impression from the object painted on the retina; the memory would be less ready in bringing up ideas to the imagination; the imagination

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would

would be less ready to arrange them, and the judgment would be much less exerted in determining the justness of that arrangement.

In so far the system would be affected pretty nearly in the same manner as a mechanical machine which had lost part of its power.

Let the same man be prevented from sleeping a second night, then irregularity would begin to take place through the system. A strong contraction would begin to take place in some of the muscular fibres of the intestines; the appetite would begin to be lost; the muscles in the exterior parts of the body would some of them act more strongly, others more weakly; the heart would sometimes contract more frequently, sometimes, although seldom, more slowly; the powers of perception, as far as depended on the body, would some of them be stronger for a short time, and soon after in the same organ weaker; the same thing would happen in the power of perception, as far as
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it depended on the mind ; memory would sometimes bring up ideas very fast, and sometimes very slowly ; the imagination would sometimes arrange ideas very readily, but not very often in the order which the judgment would approve of, and the judgment in many cases would not be exerted at all, but leave the fancy to arrange them just as it pleased ; and if a man in health continued to be prevented from sleeping, these derangements would go on and mania would often be produced.

On the other hand, if such derangements as have been described should take place from any other cause in a man in health, sleep would be prevented.

In fever, as well as in many other diseases, these disorders in the system prevent sleep in a much greater degree ; and want of sleep produces them also in a much greater degree, only instead of mania delirium takes place.

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While the disorders in the system which take place in fevers prevent sleep, the want of sleep in fevers weakens the whole system, produces the disorders which have been enumerated, and occasions delirium.

To return from this digression ; when a continued fever is produced, sometimes, when the cause of the disease is applied, there is not the least appearance of fever, or any apparent alteration from health for many days, until all at once a complete paroxysm of fever comes on. Sometimes, when the cause of fever is applied, some slight febrile appearances take place, and continue till a perfect attack of fever arises, which comes on at once, and its first paroxysm is easily ascertained ; now and then they gradually diminish and go off, without any permanent fever arising. When such slighter febrile symptoms take place, they do not increase gradually, so as to constitute a fever, but the patient goes on with his ordinary occupations ; not well indeed, but not so as to be confined,

until all at once a paroxysm, such as has been described in the dissertation on the *ephemera simplex*, takes place, so that the patient can almost always mark the very hour in which the attack comes on. Sometimes a complete paroxysm of fever is produced immediately on application of the cause.

If none of the symptoms of fever happen between the time of the application of the cause and that of the first paroxysm, a strong attack takes place at once, and begins often with a sense of coldness, horror and rigour; the cold is followed by a sensation of heat, which is succeeded again by a sense of coldness, and so alternately for the first twenty-four hours. Sometimes there is no sense of coldness, but the patient feels from the beginning very hot. Whether there be a sense of coldness or a sense of heat, the thermometer under the tongue rises to 'about one hundred, or from that to one hundred and five degrees of Fahrenheit's scale, excepting at the very first beginning of the attack. Whether there be sense of cold or of heat,

there is always great depression of strength, both in the powers of the body and the mind, which is generally according to the degree of fever, sometimes so great as to render the patient unable to support himself in an erect posture; sometimes not so considerable as to prevent him from doing his ordinary business, if he makes extraordinary exertions.

It has unluckily often happened, that physicians have been too apt to go on attending their patients for a day or two after a paroxysm has actually taken place, and unfortunately have been by that means so exhausted, as not to be able to go through the remaining part of the disease, but have been cut off.

The depression of strength is, in all degrees, between these extremes. The pulse, during the first twenty-four hours, beats seldom less than ninety times in a minute, and very seldom more than one hundred and five in a minute; whereas in an ephemera, or in the first paroxysm of an intermittent, it very often rises to one hundred and

and twenty or thirty pulsations. It is sometimes full and strong, always obstructed, sometimes small and particularly soft, sometimes of the natural fulness, but with a particular degree of softness; when this is the case, it indicates a fever which will be very violent, especially in respect to the depression of strength.

The author wishes in this place to explain his terms with regard to strength, hardness, softness, obstruction, or freedom of the pulse.

Great numbers of practitioners have called obstruction hardness, freedom softness of the pulse.

The feelings of the organs of the senses are often different in different men. The ear, for example, of one person, can distinguish accurately the different notes on the musical scale; the ear of another can distinguish nothing but that the sound is louder or less loud. In like manner, the fingers of some are only capable of distinguishing whether the pulse is more or less frequent, and that

by comparing it with some other measure of time. It is necessary, therefore, that we should have some other criterion of the differences of pulsation than the feel of the practitioner, in order to be able to teach young practitioners how to discover if they have any power of feeling different sensations, and distinguishing them.

When the pulse is hard, whether it be strong or not, the blood is long in coagulating; the consequence of which is, that if the blood flow from a vein in a large stream through the air, into a vessel nearly the section of a sphere, the red particles will fall down towards the bottom of the blood, and leave the upper surface of the coagulum colourless after the blood has coagulated: whereas if the pulse be strong, without any hardness, the blood will coagulate much sooner under the same circumstances, so as not to give time for the red particles to fall down from the upper surface of the coagulum, which will therefore be red.

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In like manner, if the pulse be obstructed and not hard, the coagulum will be red on the upper surface.

This then is a criterion by which strength and obstruction may be distinguished from hardness, viz. when the pulse is hard, the upper surface of the coagulum is not red.

It is necessary that the practitioner should make himself master of the feel of the pulsation under these different circumstances. This may be done by feeling the pulse of a patient affected with an intermittent, in which there is often strength, fulness and obstruction, but no hardness, and in which case a quantity of blood may be taken away without any detriment to the patient; and again, in a pleurisy, where there is strength and hardness, and in which blood is taken away with great propriety.

By these means any man with the faculty of feeling, so as to distinguish the different

sensations arising from pulsations, may make himself master of the difference between hardness and strength, or obstruction, which, as will be shewn afterwards, is very essential in the management of fever, obstruction being an essential symptom of fever. Hardness is an irregularity, and consequently is to be referred to that treatise, in which irregular fevers are to be considered.

In the same manner, when upon the application of the cause of fever some slight symptoms of fever take place, and continue some time, whatever were the previous symptoms, on the attack of the fever, coldness suddenly takes place, followed by heat ; or otherwise, a much greater degree of sense of heat arises suddenly, with a much greater depression of strength and a similar pulsation of the arteries, &c.

Along with these symptoms, there is generally pain in the forehead, and all the other appearances which arise in an ephemera, or the first paroxysm of an intermittent, and have
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been enumerated in the dissertations on those subjects. They proceed in the same manner, excepting that they are much more irregular in the first paroxysm of a continued fever, than they are in an ephemera or an intermittent, where the first paroxysm of an intermittent is terminated by a crisis. The sense of coldness and heat return alternately, without any regular duration of either. This happens especially when the fever is severe. The depression of strength is likewise greater or less at different times; thus there is an irregularity during the whole of the first paroxysm.

It has been a question much agitated by authors, whether fevers lasting for many days consist of one paroxysm, or of many paroxysms following each other, as happens in intermittents.

It has been observed, in the dissertation on a regular tertian, that for the first days there was no crisis in many cases, but the disease, as it went on, shewed more and more critical symptoms, until a very evident,
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or, at last, a complete crisis took place, and the disease terminated in an intermittent. In continued fevers the appearances are such as take place at the beginning of intermittents, where there is at first no intermission; the paroxysm does not terminate in a crisis, but there is some relaxation, after which a fresh paroxysm takes place. This may be considered as an argument, that a continued fever is only a variety of an intermittent. The Author of the world has laid the distinctions between different things so as to run into one another by shades. How much soever, for example, a man may differ from wheat, yet nevertheless it is difficult to determine whether a sponge be an animal or vegetable substance; things, therefore, being shaded into each other, by no means prove them to be the same. It requires, therefore, that we should be extremely circumspect in determining that a continued fever is essentially the same disease with an intermittent and an ephamera.

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There is similitude of all the appearances in the three diseases, excepting that one crisis often happens in a continued fever, and entirely carries off the disease, which takes place likewise in the ephemera; although sometimes no crisis takes place in a continued fever, this happens neither in an intermittent nor in an ephemera. This similitude has determined practitioners of the greatest eminence through the whole history of medicine to consider them as the same disease. Many have thought they varied, in this circumstance, that in a continued fever the subsequent paroxysm takes place in the hot fit of the prior paroxysm. In an ephemera no subsequent paroxysm takes place. In an intermittent, the subsequent paroxysms happen in the crisis, or after the crisis of the former.

A question arises, how long the first paroxysm of a continued fever lasts, before the second paroxysm begins.

The author has seen it happen, in a few cases of an ephemera, that the disease has continued thirty-six hours, and in one case
above

above forty hours from the attack to the termination of the crisis, but this very rarely.

The first attack of a fever begins more frequently by much, as has been observed in a former dissertation, between six o'clock in the morning and eight in the evening. In a continued fever, if the attack should be between six o'clock in the morning and eight in the evening of one day, a fresh exacerbation or sudden increase of the disease takes place, between five and six in the evening of the succeeding day.

It has been said, that sometimes a paroxysm of fever takes place as soon as the cause is applied; likewise that fever takes place at least ten times between six in the morning and eight in the evening for once in the remaining part of the twenty-four hours. This might be accounted for, from a man being exposed to the causes of fever much oftener in the day-time than during the night, when the attack follows the cause immediately. When some slight symptoms only of the disease take place at the time of the application of the causes, and when no appearances occur for
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many days after the application of the first cause; if in either of these cases the first paroxysm begins between six in the morning and eight in the evening, the author has nothing to offer to account for this phenomenon. That it is a fact he is well assured, from the observation he has made for many years in cases of a great many patients.

If it be true that a continued fever is only paroxysms of fever running into one another, it becomes a question how long these paroxysms last, and what is the cause of their return. In the first place, so far as the author's observation has gone, the first paroxysm of continued fever lasts, if it begins at six in the morning, or at any other hour before eight the evening, until five and six in the evening of the following civil day. That is, if it should happen at any time between six o'clock in the morning and eight o'clock in the evening, the second exacerbation will begin at six o'clock nearly of the subsequent civil day. But if the first paroxysm should take place between eight o'clock in the evening and five o'clock

in the morning, then the second exacerbation will take place in the evening of the subsequent day, if it should be before midnight; on the same day, if it should be after midnight.

In other words, supposing that the first paroxysm of fever should take place at six o'clock on Sunday morning, or at any time between that and six o'clock on Monday morning, the second paroxysm will take place between five and six on Monday evening.

The next thing to be attended to, is the reason why this second exacerbation, or new paroxysm of fever, should take place between five and six o'clock in the evening.

It has been before remarked, that all men, even in the most perfect health, have a feverish attack in the evening, which goes off in the morning. In a man in perfect health this attack, although not much marked, is yet sufficiently sensible. In the first place, there is a depression of strength,
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both in the body and the mind, sufficiently evident. There is not the same alacrity of mind in the evening, nor power of memory, imagination, and judgment, as there is in the morning. This proposition has been controverted by poets and philosophers, who have often praised midnight study. Two things might be objected to them; first, they are not willing to give up their connexions with the world for the sake of study; and therefore defer it until every body else is at rest. Secondly, there is that indolence in mankind, especially in those who consider speculation as their supreme happiness; which makes them wish to defer every thing to the last moment.

It is easy, however, to refer the fact to the feeling, or in other words, to the experience of all mankind; the alacrity of the mind in the morning, and its dulness in the evening, have the one been celebrated by poets and philosophers, and the other reprobated.

The muscular power of the body is likewise greater in the morning: labourers, whatever may be their habits, universally get up in the morning to their work, and go soon to bed: hunters rise early in pursuit of their game in every situation; even where the scent of the game lies better on the ground, as where a wood is enclosed, in which it is equal at any time of the twenty-four hours.

Some of the appearances which constitute part of fever, such as the contraction of the small vessels, are evidently much greater in the evening. The complexion of a woman is pale in the evening, that was rosy in the morning.

If in perfect health this natural evening paroxysm of fever is visible, it is infinitely more so in diseases of most kinds, there being none in which it has not been observed by practitioners; so much so, that it is not necessary for any further illustration of it to be laid down here.

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The cause of this natural evening paroxysm of fever has not as yet been investigated. It cannot depend upon the sun, it happens at a time of day when he is at no particular meridian; much less can it depend upon the moon, it is fixed to a particular time in the evening, whereas her appearance is perfectly mutable. It might be supposed to depend upon the fatigue of the day, but it happens equally to the labourer who goes to the plough at four o'clock in the morning, and to bed at eight in the evening, and to a woman who goes to bed at four in the morning, and rises at two in the afternoon.

It may be said, that it depends on habit; as infants, until they come to a certain age, are put to bed early in the evening, and rise early in the morning. This reason is refuted by the following circumstance: the sun rises at different times at different parts of the earth, so that it is at one part of the earth morning, when in another part of the earth it is evening. If a man, brought up in one part of the earth,

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where it is morning, when it is evening in another part, should pass from his native country to the country in which his former morning is evening, if it were habit, the natural evening paroxysm of fever ought to take place in him in the morning; but the fact is, that it takes place in the evening, in the same manner as in the natives of that country.

No method has, therefore, hitherto been found out, to account for this appearance.

Whatever be the cause of the return of a paroxysm of fever in the evening, even in health, it is evident that this propensity is the cause of the return of the second paroxysm in a continued fever.

It has been said, that if a fever takes place any time between five and six o'clock in the morning of one civil day, and five and six in the morning of the second day, the second paroxysm takes place between five and six o'clock in the evening of the second day. It sometimes happens, however,
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that no second paroxysm takes place between five and six in the evening of the second day; in this case, the fever wears off, and is an ephamera; such cases, however, rarely happen. The author has indeed had occasion to observe them four or five times in his practice. As far as can be judged, therefore, it is the disposition to natural evening paroxysm of fever, that reproduces the paroxysms of continued fevers.

The causes then which reproduce fever are apparently two, one that reproduces a remittent and intermittent fever at the expiration of a certain period of time; the other the natural evening paroxysm, which reproduces a continued fever; both of which, as far as the science of medicine has hitherto been investigated, are perfectly incomprehensible.

It is to be remarked in the first place, that these different causes serve to distinguish between an intermittent and remittent on one hand, and a continued fever on the other hand. For if we find, in the first days of a fever, when there is no perfect inter-

mission, that the exacerbation takes place between five and six o'clock in the evening, or a little later, we may conclude, that the disease is a continued fever; but if the exacerbations take place at any other time in the twenty-four hours, that it will terminate in an intermittent or remittent fever.

The next circumstance, that depends upon this doctrine, is the time of the beginning of a continued fever.

There has been much said about the days of a fever; it is clearly impossible to determine the day, unless we can tell on what day the fever began. If in continued fever, the second exacerbation always takes place between five and six o'clock in the evening; the third paroxysm, and the fourth, fifth, &c. also begin between five and six o'clock in the evening; the first must be conceived to begin between five and six o'clock in the evening, whatever time it really took place, according to the rule already laid down, by which it has been
shewn

shewn at what time the second paroxysm actually takes place, the first being considered as beginning 24 hours sooner.

It has been already said, that the first paroxysm of a continued fever is irregular, with a greater or less degree of violence, seldom, however, so violent as the subsequent paroxysm.

The second paroxysm is generally regular ; it rarely begins with a sense of coldness ; the head-ach is considerably increased ; the pulse is from ninety strokes in a minute to an hundred and ten, seldom more frequent, excepting when the disease is to be an irregular continued fever, which is to be the subject of a future dissertation ; it is always obstructed, not often hard ; when it is hard, this likewise indicates irregular fever, which will also be the subject of a future dissertation ; lastly, it is of different degrees of fulness and strength. Depression of strength is undoubtedly an universal and constant symptom of fever, and therefore cannot be considered as an irregularity ; the degree, however, of depression of strength, is very

various ; when it is very great, the pulse has a very peculiar feel of softness.

The heat taken by the thermometer under the tongue, is from ninety-nine to one hundred and five of Fahrenheit's thermometer ; to the feel of the patient, it is generally greater, sometimes excessive ; to another person, always more or less pungent. The appetite is likewise lost to a greater or less degree, according to the violence of the disease, often totally : there is always some degree of nausea, often sickness, and sometimes vomiting. Thirst is sometimes very great, sometimes inconsiderable, or hardly felt. The evacuations are generally suppressed ; the patient is costive ; the skin dry ; the urine is in small quantity, and after standing some time, continues transparent ; the mouth is dry. The mind is always more or less confused ; sometimes even so early as in the second paroxysm, the patient is delirious during the whole night ; sometimes again the sleep is only confused with dreams. The tongue, which in the first paroxysm was only covered all over with a very thin whitish crust, is now generally

generally become browner ; if the fever is more severe, this crust is thicker : when the depression of strength is great, it is clammy. There is a sense of weight about the precordia, likewise a sense of depression and anxiety.

The author has hesitated much whether he should describe a fever, in which the strength is very much depressed, as an irregular fever. After mature deliberation, however, he can hardly allow himself to distinguish it as such. It is true, Sir John Pringle, and many other practitioners, being attracted by the appearance of putrefaction which takes place in fevers where the strength is greatly depressed, have supposed that the disease depends on putrefaction of the fluids, and not the putrefaction of the fluids upon the disease. If the putrefaction of the fluids is subsequent to the depression of strength, and if a certain degree of depression of strength takes place in all fevers, in that case certainly the putrefaction of the fluids cannot be considered either as the effect of putrefaction, or

as an accident happening in fevers. This argument will be more fully entered into afterwards; it is therefore only to be remarked now, that according to the degree of depression of strength, a greater or less weight is felt about the precordia: sometimes depression of the mind, as if some great misfortune had happened to the patient, which he cannot describe, and sighs arise involuntary from his breast.

The degree of depression of strength generally determines the wish to be in bed; where, as has already been observed, the muscles have the least exertion. When it is not very great, however, and when the patient is naturally spirited, he wishes to get up in the day-time, but is generally forced to lie down several times in the course of the day. The skin appears of a dusky dingy colour, the ground of which has been already explained in a former dissertation.

There is pain in the forehead, immediately over the eyes, which feels to the patient in the skin, or immediately below it,

it. This pain is sometimes slight, sometimes very severe; sometimes reaches all round the head, but is always external, to the feel of the patient.

Sometimes there is depression of strength only in the extremities, and a feel of weariness. At other times there is a feel of soreness, as if the patient had been beat all over, or such as arises after a very strong contraction of any muscle. This last symptom takes place only when the fever is very severe. All these appearances come on, or are increased, between five and six o'clock in the evening; increase gradually, and are at their greatest height about two or three o'clock in the morning. Afterwards, in slighter cases, the patient has some tolerable sleep; it is a very severe fever indeed in which he has none; but even then he is less restless, and is relieved in a greater or less degree from all the symptoms about five or six o'clock in the morning. Although all the appearances that have been enumerated remain, yet they remain with less severity than

than they were felt about two o'clock in the morning.

The third paroxysm is more severe than the second, and so every evening the disease continues to increase for the first week.

The author has already ventured to hint an opinion, that the putrefaction of the fluids, which sometimes takes place in fever, is the consequence of the depression of strength, and not the cause of it. The contrary opinion has been held by Sir John Pringle, and many other of the first authorities in medicine, and therefore requires very particular attention.

It has pleased the Almighty, that animals and vegetables should be continued by succession. The present race of both die, some in a shorter, some in a longer period of time; but all die at last, and are succeeded by their progeny, each species producing successors perfectly, or nearly similar in properties to itself.

When

When one race dies, it is evident that some means should be adapted to destroy the matter of which it consisted. A new race of vegetables would have no room on the earth, if the old vegetables remained exactly in the same situation in which they died ; a tree would soon be buried in its own leaves ; even animals would soon cover the whole face of the earth, so as not to give room to new animals, without constantly treading over the bodies of their ancestors ; the sea would become one mass of dead fish.

The all-wise Creator of all beings has, therefore, found means, with perfect facility, to get rid of this, as well as every other difficulty, that the small degree of discernment of mankind has been able to perceive in the creation. There are two modes in which this is performed, as far as the subject has been investigated. One is by creating many insects and reptiles, which live upon dead matter ; these are much more numerous in the warmer regions of the earth, where both vegetation and the growth of animals go on with greater rapidity. How soon do the
termites

termites destroy in a warm climate all dead vegetable matter !

The other mode is by making animal and vegetable substances subject to processes, which are called fermentations, the ground of which the author has endeavoured to set forth in his Treatise on Digestion, which fermentations terminate in putrefaction. It would be improper here to say any thing further of this process, than that it converts all animal and vegetable matter into certain salts, into vapours in a small proportion, but principally into earth and water.

It has been observed, in recounting the causes of fever, that one cause was the vapour arising from putrefying substances.

If to dead animal matter a putrefying substance, or vapour arising from a putrefying substance be applied, putrefaction will take place in it much more readily than in a dead animal or vegetable substance to which no putrefying substance has been applied. A question therefore arises, whether a putrefying

fyng substance, or the vapour arising from a putrefying substance, applied to living animal matter, will produce putrefaction sooner than if no such substance or vapour were applied.

It has been already shewn, that it is necessary that dead animal and vegetable substances should be destroyed; it has also been said, that it has pleased the Almighty, that all living animals and vegetables should die.

The manner in which all living animal and vegetable substances are to die, and so be lost, is very different, however, from the mode in which animal and vegetable matter when dead, is to be destroyed.

A living animal, or vegetable, is produced by its parent, weak at first and imperfect; it acquires perfection by degrees, until it becomes capable of all the purposes for which it is destined. Among these purposes, one is, to be capable of propagating its species; and for this, after some time, it has

less and less power ; at last its faculties begin to decay, and gradually decay until the whole of them are lost, and the animal or vegetable dies. In man this progress is more marked than in any other part of the creation.

In this manner man is to live through his life and die, but during his life he is not subject to the laws of dead animal and vegetable matter ; among these, therefore, not subject to putrefaction. If man, when alive, were subject to the laws of putrefaction, why should he be placed in every situation in which putrefaction most readily takes place ?

Putrefaction takes place most readily in a heat of one hundred degrees of Fahrenheit's thermometer : it goes on much more slowly in a heat of one hundred and ten ; hardly in animal substances in the heat of one hundred and fifty ; it goes on more slowly in less degrees of heat than one hundred, and scarcely at all in forty degrees of Fahrenheit's thermometer.

The heat of the human body, in health and vigour, is generally ninety-seven degrees
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and an half of Fahrenheit's thermometer. It varies in disease, sometimes from ninety-two to one hundred and seven. It is always therefore, both in health and disease, near the most proper heat for putrefaction, yet no appearances of putrefaction take place in the blood, nor in any part which is alive, excepting in fever and sea-scurvy.

Another circumstance which forwards putrefaction is exposure to pure air. If an animal substance, the moment it dies, is perfectly excluded from pure air, it will not putrefy ; on the other hand, if a great blast of pure air be constantly applied to it, it will putrefy much more slowly than if a moderate quantity be applied. The application of a moderate quantity, therefore, is the best means of producing putrefaction ; a moderate quantity of pure air is actually applied to the matter of the body of a living man. The vapours constituting the atmosphere contain a fourth part of pure air, are applied only to the surfaces of the body, that is, to the skin ; the surface of the nostrils, mouth, and lungs, which form a
very

very small part of the solids ; and the pure air of the atmosphere has a moderate effect on the blood passing through the lungs. That it does affect it in a certain degree appears from its giving a yellow colour to the red blood, so as to render it scarlet. As far, therefore, as application of air tends to produce putrefaction, the human body is in that situation, in which putrefaction would most readily take place.

Another circumstance under which the putrefactive fermentation takes place more readily is motion. In the human body the fluids are in constant and very rapid motion: the heart contracts seventy-three times in a minute. It has been supposed, that as near as can be measured, it sends out at each contraction two ounces of blood in a minute ; supposing then that the blood is in the largest quantity that has ever been stated, to wit, sixty pounds, the whole of it will be circulated through all the canals in the body, and return to the heart, in six minutes.

To

To give a more distinct idea of the velocity with which the blood moves in the veins, where it moves with the least velocity, let a man compress a vein on the back of his hand at some distance from the valve, immediately above, and squeeze out the blood up to the next valve; so that the vein shall disappear; then let him immediately remove the pressure, he will find the vein fill again faster than his eye can trace. The blood, therefore, has always constant and rapid motion.

It is evident, therefore, that the matter of the living human body is always in circumstances, in which dead animal matter would putrefy most readily.

It has been alledged, that certain salts, or other matters, contained in the blood, and other parts of a living man, prevent the other matter in his body from putrefying, or that the putrescent matters were carried off, and fresh matter introduced, so as to pre-

vent putrefaction from taking place. Those who have advanced the former part of this doctrine have forgotten, that if the body of a dead man is left in the heat of ninety-seven and a half degrees of Fahrenheit's thermometer, without motion and application of the air to the blood or the lungs, although the same salts, or other substances remain exactly, putrefaction takes place in twenty-four hours in a very violent degree.

Against the opinion of some authors, that matter is constantly carried off, and new matter introduced, and by that means the putrefaction prevented, the following argument is sufficient. It is well known, that a man may live under all the necessary and most powerful circumstances of putrefaction, without any thing being taken in for twenty-four hours, or evacuated, excepting the water that flies off by insensible perspiration; yet there is not the smallest appearance of putrefaction in the body. If, however, a man had been destroyed instantly, when in perfect health, by some accident, such as a wound in the spinal marrow, between the first and
second

second vertebræ of the neck; putrefaction would take place in that space of time, if the temperature of the dead body was confined to ninety-seven degrees and an half of Fahrenheit's thermometer, although it was not assisted by exposure to the air in respiration, or by motion.

Since, therefore, it is known, that although the body of a living man be in every situation most proper for putrefaction, and nothing is applied which would prevent the same body, if it was dead, from putrefying, nevertheless the body of a living man has no appearance of putrefaction; it necessarily follows that there is in the life, independent of all other circumstances, a power of preventing putrefaction. In other words, it is the property of living matter to remain untainted by putrefaction; the property of dead animal and vegetable matter to putrefy.

Mankind, ever inquisitive, from the disposition which the Almighty has chosen to place in their minds, are constantly endeavouring

deavouring to find reasons for every effect happening according to something they are already acquainted with. In this particular case they have supposed, that the operations which take place in living animal matter should agree chymically with operations that they can perform in dead animal matter. They have, therefore, concluded, that since animal matter, when alive, is prevented from putrefying in certain circumstances in which it would have putrefied very readily when dead, this must be occasioned by means which would have prevented dead animal matter from putrefying, if it had been in the same circumstances. No such means, however, have been shewn to be applied to living animal matter.

Was it not as easy for the Almighty to make a law, that living animal matter should not putrefy, and that dead animal matter should putrefy, as to make a law that if one mass of matter be placed at a distance from another mass, the two should immediately, if not prevented by some cause, begin to approach each other.

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The author by no means wishes it to be understood, that it is unnecessary to enquire, whether it be or be not so; that must be investigated by experiments and observations. He has shewn that every circumstance which would make putrefaction take place in the dead body of a man, is constantly applied in the living body; and that no chymical circumstance has been discovered in the body of a living man, to prevent such putrefaction from taking place. He therefore concludes, that it is an original law given by the Creator, that living matter should not putrefy, and that dead animal or vegetable matter should putrefy and be destroyed.

The heat of living animal and vegetable substances will admit of a parity of reasoning; but this is foreign to the present subject.

Thus far the author has enquired, whether the human body, when alive, has a power of resisting putrefaction when exposed to all the

circumstances which promote putrefaction in a dead human body.

The point that the author set out with was, whether putrescent matter, applied to the body, produced a fever, and in that fever depression of strength, which occasioned putrefaction; or if the putrid matter applied to the body occasioned putrefaction of the fluids, as a ferment or otherwise, and that putrefaction brought on a depression of strength.

Many people are constantly exposed to putrid matter, both in a solid and fluid state; as also to the vapours arising from putrid substances, and yet no putrefaction, or any appearance of putrefaction, is found in their blood: those, for example, who are employed in cleaning out putrid ditches, or the common sewers of great towns, in their blood, or in any other part of their body, no appearance of putrefaction is ever perceived.

Unless,

Unless, therefore, a fever is produced, and depression of strength as part of that fever, it is evident that putrid matter does not occasion any appearance of putrefaction.

When a fever is produced by putrid vapour, or any other cause, if the fever be in a great degree, there is great depression of strength at the first; but for several days there is no appearance whatever of any putrefaction in the fluids. Blood taken from the arm coagulates firmly; the tongue is covered with a whitish crust; there is no putrid smell in the air from the lungs, nor in any of the other evacuations; there are no marks upon the skin; there is no appearance of putrefaction in short in any parts of the body; but besides the great feel of depression of bodily strength, there is great depression of spirits, and sense of weight about the precordia, with a peculiar imbecility in the pulse.

As therefore the depression of strength takes place first, and the putrefaction afterwards, according to the usual precedence

of cause and effect, to wit, that the effect follows the cause, it seems to be sufficiently proved, that depression of strength is the cause of the putrefaction, and not the putrefaction the cause of the depression of strength.

In sea scurvy, as it is called, the putrefaction of the fluids arises undoubtedly from animal food being used without a sufficient quantity of vegetables of a loose texture, to prevent it from entering in part into the putrefactive fermentation during the digestion. This happens especially when the animal food is preserved by salt. In such cases a chyle is thrown into the blood-vessels loaded with putrescent matter. In this disease the first symptoms which take place are always languor and depression of strength, and inability of exerting the muscular powers. Afterwards symptoms of putrefaction come on. This shews that even in this case it is the depression of strength that occasions the putrefaction.

Since,

Since, therefore, the solids and fluids of a living man are placed in situations the most proper for putrefaction ;

Since there is nothing applied to the living body to prevent putrefaction, which is not also applied to the dead body when it putrefies very fast ;

Since no fresh matter is added to the living body during the time in which the dead body, placed in the same circumstances, would putrefy.

Since the depression of strength takes place always in a fever before there be any appearances of putrefaction ;

And lastly, since when the blood is rendered putrid by putrescent matter being thrown into it, depression of strength always takes place before there be any appearance of putrefaction ;

It may be concluded, that the depression of strength is the cause of the putrefaction
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of the fluids in fever, and not the putrefaction of the fluids the cause of the depression of strength.

Symptoms of putrefaction rarely appear in the second paroxysm of a continued fever; seldom in the third paroxysm, or third day of the disease, counting as has been already laid down.

The symptoms of putrefaction, when they first take place, are alterations in the appearance of the secretions. The urine first has a more viscid appearance than common; is frothy, browner, and not absolutely transparent, although there is no cloud or sediment. If the putrefaction is still greater, it becomes of a dark brown, and loses its transparency, and sometimes a dark brown sediment falls to the bottom of the vessel, after it has stood an hour or two. The fœces begin to be fœtid, and at last have a very putrid fœtor, which, however, is to be distinguished from the fœtor of the inflammable air, which is often discharged and is very fœtid, although there be no putrefaction. The
fœces

fæces are also not uncommonly black and liquid. The sweat, if there should be any, tinges the linen with a dilute ichorous appearance. The crust which forms upon the tongue appears browner and more clammy; as the fever goes on it grows browner and browner, until at last it is quite black; the teeth, rubbing it off from the tongue, become as it were buried in a black slime; this hardly takes place before the end of the first week of the disease; the breath also becomes fœtid.

There sometimes appears upon the skin, but not excepting the putrefaction has arisen to a considerable degree, a kind of discolouration, similar to the appearances which we find in polished marble, not purely white, which are called bluish veins. When the degree of putrefaction is more considerable, dark purple spots, of various sizes, are formed in the skin; if the putrefaction be still more considerable, the skin becomes all over of a dark purple colour.

At the beginning, when the putrefaction has not gone to any great length, if blood should happen to have been taken from the arm, the coagulum is loose and easily broken, the serum being hardly of a browner colour than common. Sometimes when the depression of strength is not very great, the blood retains this appearance during the whole course of the disease. Should the patient become so weak, as to be carried off by the weakness, this appearance is not altered, for it is depression of strength, not weakness, which produces putrefaction.

If there is greater depression of strength, and by consequence putrefaction is in a greater degree, the serum becomes of a browner colour. In a still further degree, it is red : in this case, on examining the red particles with a microscope, many of them are found diminished in size, and not regular spheres, or oblate spheroids; some have the appearance of being broken in two, and look like half moons: but most of them retain their healthy appearance. If the putrefaction goes on still further, there is hardly
any

any distinction between serum and coagulum ; if still further, the coagulable lymph forms a kind of bag, leaving the serum on the outside distinct. In the substance of the bag itself there is no intermixture of red particles, so that it looks like the buff, which is on the surface of the coagulum in cases of general inflammation ; but within this bag a red fluid is contained, which, upon being examined with a microscope, shews the red particles of a variety of forms.

All these appearances the author has seen. There are some cases upon record in which it is stated, that the blood was absolutely fœtid ; and a practitioner of perfect credit, who practised a considerable time in hot climates, told me he had seen several cases, where the blood taken from the arm was actually fœtid.

As depression of strength produces putrefaction of the fluids, so, on the other hand, putrefaction of the fluids occasions greater depression of strength, sometimes in a degree that proves fatal : in this case the
pulse

pulse often towards the end beats faster than can be counted.

It happens more frequently that hemorrhage arises, almost indiscriminately, from any of the cavities which open externally: these hemorrhages are very dangerous, and often fatal.

Depression of strength happens in a greater or less degree in all fevers; in many it does not happen in such a degree as to produce any sensible appearance of putrefaction of the blood; yet as the cases in which it does produce putrefaction of the blood, and those in which it does not produce any appearance of putrefaction of it, only differ in degree, it can never form an irregularity of fever; it can only give rise to a variety, which does not at all affect the practice, as will be afterwards shewn.

At particular times it is very rare that any great mark of putrefaction takes place; at other times it is more frequent. It

was common enough in London from one thousand seven hundred and fifty, to one thousand seven hundred and sixty-five; from that time the severer symptoms of putrefaction have been seldomer seen; and from one thousand seven hundred and seventy-five to this period, one thousand seven hundred and ninety-seven, they have been very rarely seen indeed in fevers.

Among the symptoms of the disease, which gradually increase from the second exacerbation to the end of the first week, or sometimes a little longer, is delirium, which will likewise require a more minute investigation.

In the first place, it is necessary to distinguish between two derangements of the mind, delirium and mania.

The common distinction has been, that delirium is derangement of the mind with fever, and mania without fever. Those who have given this distinction, have by no means that idea of fever which the author
has

has endeavoured to illustrate; if they meant by fever frequency of the pulse, mania undoubtedly exists very often with frequency of the pulse.

It is rare for a person affected with mania to be seized with fever; it is also very rare for a person in a fever, such as the author is endeavouring to describe, to be seized with mania.

Mania is that derangement of the mind in which, although the material parts of the organs of sensation are in perfect order, yet the mind often takes wrong ideas from them. Although a windmill be painted on the retina, the figure represented to the mind is that of a giant. In delirium, the impression made on the organs of the senses is always imperfect, in as far as the material part is concerned: the eye, for example, is incapable of adjusting itself so as to form a distinct image on the retina, which can be perceived by the mind; but in as far as it can be perceived, it is always true. A man in a delirium never takes one object for another; he

he only has an obscure sensation, which he endeavours to take some idea from. A man in mania; supposing the ideas taken from his senses and brought back by his memory, were true, has his imagination such as often to arrange them perfectly, and his judgment is sometimes clear in determining whether the arrangement is just.

A man in delirium, having no accurate idea impressed by the organs of senses, nor brought up by the memory, has nothing in his mind but complete confusion.

In mania, agreeable objects frequently occupy the mind; in delirium, hardly ever. The patient is wandering among tombs, falling over precipices, deserted by his friends, or perpetually in some other misfortune.

Delirium takes place in many diseases in which there is no fever. In fever delirium may arise from the fever itself, or from certain accidents which take place in irregular fevers. Delirium which takes place from

fever itself, is at present to be inquired into.

When delirium has taken place from fever itself, it has been generally believed that it arose from an inflammation of the brain. There are indeed some cases recorded, in which it has been said, that upon opening the heads of patients who have died of delirium from fever, a suppuration of the brain has been found. Hence it has been concluded, that delirium in fever has always been owing to inflammation of the brain. The author has caused the heads of many patients, who have died with very great delirium in fever, to be opened, and never found any marks of suppuration. Most commonly the brain appeared exactly as it is commonly found. Sometimes the blood-vessels were distended with blood, but never was any suppuration found. Generally no uncommon appearance at all.

Among the numerous dissections which are made in the anatomical schools, many are made of those who have died of fevers; yet it
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is very rare for any thing like suppuration in the brain to be seen.

It has just been said, that delirium may arise from accidents, which take place in fevers; such deliriums will be treated of in that dissertation, in which the irregularities which arise in continued fevers will be described.

Delirium, arising from the fever itself, will only here be treated of. Delirium, arising from the fever itself, appears to be of two species; one, in the first place, in which, neither in the body, while it is alive, nor by dissection in the dead body, can any mark of alteration in the material part of the brain be found. In the other we might have some suspicion, even during the lifetime, that the material part of the brain was altered; and some alteration of the material part is actually found upon dissection after the death of the patient.

In that species of delirium, in which there is no mark of affection of the mate-

rial part of the brain during the life of the patient, or on dissection after his death, is it to be supposed that, nevertheless, the material part of the brain is actually affected? Is it to be taken for granted, that the mind exists in the brain, and governs the body, seated as on a throne, sending his messengers to the other parts of his dominions? It may be necessary to consider the question.

The structure of the brain is very grossly and imperfectly known; and its ordinary appearances have been so well described by anatomists, that it is by no means necessary to enter into particulars here. Suffice it to say, that in the human body there are two laminæ, one of a whiter colour, one of a browner grey, laid upon one another, and puckered up as well as could be in the cavity of the scull. The whole is covered on the outside with membranes, which touch and adhere to the scull on the outside, and touch each other on the inside, but do not adhere, so that fluids now and then get between them. From the white part
arises

arises a number of fibres, which run to every part of the body, which we call nerves. When these are cut through, the mind loses its power of producing muscular contraction. From anatomy this is the only reason to suppose, that the mind is situated in the brain, and that it can be deranged by the derangement of the material part of the brain.

Again, certain alterations of the material part of the brain undoubtedly derange the mind. A man whose scull is fractured is generally, in consequence of the mischief done to the brain, rendered delirious. An inflammation of the brain in many cases produces delirium; not in all. This might lead to a belief, that the mind resides in the brain. On the other hand, the nerves going to a part, may be totally cut through in the human body, yet motion in that part may remain; it may live long afterwards, may regain its sensibility, and in consequence affect the mind, even although the nerves were not

again reunited. This was the case in Mr. Hewson, who in dissecting cut the nerve going to one of his fingers; after some time he recovered perfect sensation and use of it, although the nerve never reunited.

Injuries done to other parts of the body, as well as the brain, produce delirium, when there is not the smallest appearance, upon dissection, of any injury done to the brain. Inflammation of the diaphragm produces delirium and death, when on dissection there is no apparent alteration of the brain.

The brain may also be very much altered, almost entirely converted into pus, without delirium. Of this instances have appeared in Dr. Hunter's dissecting room. In one of these, it was well known, that there was no derangement of the mind during the inflammation or suppuration; but the patient was carried off by a disease, in which the brain could hardly be conceived to have its material part at all disordered.

So far there may be very considerable doubt, whether delirium always arises from disorder of the material part of the brain.

Again, if we refer to our feelings, we undoubtedly feel as if the memory, imagination, and judgment were in the head. The sensations, however, are generally referred to the part of the body to which the application is made; we feel pain in the finger when it is pricked with a needle. The passions are always referred to the breast, as common language shows.

Lastly, the author has in several cases seen it happen, that a delirious patient in fever, without any abatement of any of the other symptoms of the disease, has become perfectly sensible. In all these cases death has followed shortly; that is, in less than twenty-four hours, as if the mind had escaped from the disease of the body before it had left it entirely.

All these considerations have induced a doubt in the author, whether delirium may not arise in fever as an affection of the mind only, independent of any affection of the material part of the body.

Another kind of delirium takes place from the fever itself, and the patient dies in consequence of the delirium; or at least when the delirium is very severe. In this kind, on dissection, the author has found the vessels of the brain, including the whole of it, that is, the brain, cerebellum, membranes, &c. all turgid with blood, although it never happened in any of the cases which he has caused to be dissected, that there was any peculiar affection of one part more than of another, or any thing like suppuration.

From the foregoing statement the author is led to think, that from fever itself, and without any accident or irregularity, two species of delirium arise; one without any material affection of the brain, the other with fulness of the vessels of the brain.

Independently

Independently of this consideration, the author conceives that external appearances of two kinds of delirium take place, in consequence of a regular continued fever itself, which he now means to attempt to describe.

The first species seldom happens in the first paroxysm of a regular continued fever, excepting it be very severe; there is very often some appearance of it in the second evening of the disease; the patient sleeps confusedly; immediately upon waking, does not recollect his bed, or bed chamber, or the people that are about him; but recollection returns in a few minutes, the eyes are sufficiently clear, neither confused nor stupid, nor are the blood vessels fuller than in the ordinary state.

There is a degree of perfect stupidity and listlessness in the appearance of the eye, which takes place not uncommonly in the first exacerbation of a continued fever, which is a very fatal symptom, but which the author thinks is an irregularity in the disease,

disease, and which in consequence will be taken notice of in a future dissertation.

The want of perfect recollection, if the disease is not very violent, goes off generally in the morning, about seven or eight o'clock of the civil day, and the patient remains recollected till the beginning of the fourth paroxysm, but yet not perfectly clear in his ideas, and in full possession of the powers of his mind.

Every evening the delirium grows more and more severe ; but still there is very considerable relaxation in the day time, and this continues to increase until the seventh or eighth day of the disease.

When this kind of delirium arises to a great height, about five or six o'clock in the evening, the patient begins to be very confused ; hardly to know the people about him ; to talk much and confusedly about his affairs ; to be violent. This violence increases till about midnight, when, if the disease is very great, he endeavours to jump out of bed, or tries to climb up to the top
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of it, and becomes perfectly unmanageable. This goes on till two or three o'clock in the morning. Then by degrees it subsides, and he becomes something more sensible about four or five o'clock in the morning. Afterwards perhaps he gets a little sleep, wakes not so confused, and during the day-time remains more or less sensible to external objects.

These appearances go on much the same for five or six days, if no crisis should take place. About the fourteenth day of the disease this delirium begins to subside; the patient becomes much more sensible in the day-time; the evening attacks become much more conspicuous, although not so violent, until the disease finally goes off, the delirium being almost the first symptom of it that disappears.

The second species of delirium, arising in a regular continued fever from the fever itself, seems to go through the following progress.

It also evidently begins to appear in the second paroxysm of the disease. There is in
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the evening the same confusion in the perception; the eyes have their vessels somewhat enlarged; the cheeks are a little flushed. These appearances go on increasing during the first week of the disease; the confusion grows greater in the evening, and sometimes all that violent agitation, which has been described in the former species of delirium, takes place; but in that case the patient does not recover in the morning, but lies stupid and almost insensible. Afterwards if the disease be very violent, stronger and more violent delirium begins to take place between five and six o'clock in the evening, which increases until two or three o'clock in the morning, and then by degrees the patient again falls into the same stupor. If this should continue till about the fourteenth day, the evening attacks become by degrees less, but the stupor continues, with deafness, and inattention to external objects, and these appearances remain the very last symptoms of the disease.

The author is rather induced to believe, from the fulness of the vessels of the eye, the flushing of the face, and the continuance of the stupor after the fever is gone off, that in this species of delirium the material part of the brain is affected, especially as when patients have died of this species of delirium, the author, upon dissection, has found the vessels of the brain distended with blood.

It is to be observed, however, that between these two appearances of delirium there are gradations, as we find in almost every thing relating to the human body.

Whether the author be right or no, in supposing that there are these two species of delirium depending upon fever itself, delirium, whether it be of one species, or if both species exist, affects not only the mind, but the functions of the body also.

From the 2d day of the disease the delirium, if it takes place, gradually increases, and along with it all the appearances of fever; the tongue
grows

grows fouler from the beginning to the middle of the second week, excepting where there are appearances of putrefaction, as have already been enumerated, there is no sliminess, but a greater crust. Towards the end of the second week this crust, more or less, disappears, and the surface of the tongue looks raw when moist, when dry has a polished glaze, especially about the middle, some of the crust remaining upon the sides, towards the edges. The skin has a more dusky colour, and feels uneasy; the patient picks hairs from the bed-cloaths. The eyes appear more confused. Black spots seem to the patient to be moving in the air. The appetite is more or less diminished, and often totally lost. Spasmodic contractions of the intestines take place in a greater degree. The pain in the forehead, or rather the sensation of it, is not so much complained of. The secretions continue suppressed, the skin dry, &c. There are greater flatulencies, and the fever every way increases along with the delirium.

Whether

Whether it be that the fever is gradually increasing, and delirium along with it, or that delirium is the occasion of the increase of it, the fever goes on in proportion with the delirium. Although the patient should be insensible to all external objects; although he should sleep very little, or scarcely at all; yet, if the deglutition and respiration should remain unimpeded, the patient is not to be despaired of; it happens even most commonly that he recovers. But if he respire with great difficulty, or hardly at all, or if the deglutition be almost totally prevented, or if attempting, it throws the patient into convulsive contractions, he rarely recovers.

On the other hand, if the other febrile appearances do not keep pace with the delirium; though the pulse should become more slow, and less obstructed; though the tongue should become cleaner and moister; though the colour of the skin should become more natural, the secretory vessels more relaxed; if, however, the delirium should still continue, without stupor or deafness,

deafness, and the other marks which have been pointed as accompanying delirium, with fulness of the vessels of the brain; in such case, notwithstanding the practitioner and by-stander are flattered, the patient is frequently cut off. When these last described appearances take place, that is, if delirium continues of the first kind without diminution, the author has conceived that some mischief has happened to the brain, or some other part of the body; but although he has caused several to be opened who have died under these circumstances, he has never been able to find any appearance different from what is commonly found in persons dying of diseases, which make no alteration in the structure of the body.

Thus the fever continues to increase from the beginning of the first, and sometimes to the middle of the second week of the disease, and continues in the same degree, unless it should be carried off by a crisis. A crisis in a continued fever, as described by Hippocrates, has been a matter of great debate,

debate, not only since, but probably long before his time. A crisis which takes place in a regular continued fever may be considered in the following manner :

The author has endeavoured to state, that a continued fever differs from an intermittent, or remittent, in this, that in an intermittent or remittent the paroxysms, or exacerbations, recur principally between six o'clock in the morning and five o'clock in the evening of the civil day; but that in continued fevers the exacerbations take place between five and six o'clock in the evening.

When a very severe exacerbation occurs in a regular tertian intermittent, the author has already said, in a dissertation on that subject, that a complete crisis sometimes takes place, and carries off the disease. In like manner, in continued fever, if a strong exacerbation should happen in the evening, the severity of the attack may prove fatal; but on the other hand, instead of producing a relaxation only between five and six o'clock in the morning, it may occasion

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sion a complete crisis, and so in a few hours terminate the disease.

In speaking of a crisis in a regular continued fever, it is always to be understood, and is so considered by Hippocrates, that there may be a bad crisis, and even a fatal one, from the violence of the attack of that paroxysm; or a good crisis carrying off the disease altogether, or giving great relief to the patient.

The first thing to be taken into consideration is, whether any such crisis ever takes place or not. How this should have become a question can hardly be conceived, since instances of such crises must have occurred to every practitioner who has had occasion to see a number of cases of the disease. Others have insisted, that crises happen in all continued fevers. This opinion can never be held by any practitioner who has had much practice in this country.

In different climates, the taking place of crises has been variously described. In very
hot

hot climates, fevers are represented by practitioners versed in the diseases of those climates, as if they were all intermittent or remittent; in which case, more or less perfect crises always take place: to wit, in climates in which the temperature of the atmosphere in the shade is from about eighty degrees to one hundred, or an hundred and ten.

The same thing is also true where the variation of the temperature is very great. In Carolina, for example, where in one day, from the variation of the wind, the heat may rise from under ten to upwards of sixty degrees of Fahrenheit's thermometer. In countries not quite so hot, and not so variable, as in the Mediterranean, authors have described continued fevers as almost always terminating by crisis. In this country, as far as the author's observation has gone, hardly one third of fevers have been carried off by crises, such as the author has just described. In colder countries, where the inhabitants expose themselves to the temperature of the cold atmosphere, as in Siberia, continued fevers are

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very

very rare, and crises scarcely ever take place in them.

Hippocrates has not only laid down that continued fevers are terminated by crises, but also that these crises take place on certain particular days of the disease, which he has called critical days. This doctrine has afforded a ground of great dispute.

When it is affirmed, that a fever terminates on a certain day of the disease by crisis, the first question undoubtedly is, what is to be accounted the first day of the disease. The author has endeavoured to show, that the beginning of the fever is not to be counted from the hour of the first attack, but from the second attack, or first exacerbation of the disease, which begins between five and six o'clock in the evening. He has said, that most commonly, if the disease begins before six o'clock in the morning, the second attack takes place between five and six o'clock in the evening of the same civil day, and by consequence that the fever is to be considered as beginning between
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five and six o'clock in the evening of the preceding civil day; but that generally, if the first attack be after six o'clock in the morning of the civil day, as is commonly the case, the fever cannot be considered as beginning till five or six o'clock in the evening of the same civil day, the second attack, or first exacerbation of the disease, not happening till five or six o'clock in the evening of the subsequent civil day.

In other words, supposing the disease should take place between six o'clock in the morning of Sunday, and six o'clock in the morning of Monday, the beginning of the first day of the fever must generally be taken between five and six o'clock in the evening of Sunday.

There are some cases in which there are exceptions, but these will be considered among the irregularities which take place in the disease.

Having thus pointed out from what time we are to reckon the beginning of the disease,

that crises take place in the first twelve hours of the exacerbation, it will be easy to settle the days of the disease on which crises occur.

Excepting in intermittent and remittent fevers, crises very rarely happen in the first week of the disease unless on the seventh day. Hippocrates enumerates, however, in the different works ascribed to him, the fifth, sixth, seventh, ninth, eleventh, thirteenth and fourteenth, seventeenth, twentieth, and twenty-first days as critical days. He also says, that although these be the true critical days, yet that there are spurious critical days, viz. the eighth, tenth, and twelfth, &c. and that it is known whether the fever had perfect or spurious critical days, by one day being an indication of another. That is, if you find a strong exacerbation take place on the seventh, and also considerable relaxation between five and six o'clock in the morning; if you find a coldness take place about six o'clock in the evening, or at least considerable dryness of the skin, very great heat,

greater

greater foulness of the tongue, and more violent delirium on the beginning of the seventh day, viz. between five and six o'clock in the evening, and if these appearances increase very much till three or four o'clock in the morning, and then subside, and the patient is more sensible than he was the morning before; if his skin and tongue become moister, his tongue cleaner, and the secretory vessels relaxed, although no complete crisis take place, you are to consider in that fever the seventh, ninth days, &c. as the true critical days, and that the patient had a better chance of recovering on these days. On the other hand, if a stronger attack and greater relaxation take place first, at the beginning of the eighth day of the disease, then the disease will observe spurious critical days, and the tenth, twelfth, &c. will be the critical days, and the patient will have more chance of recovering on these days; but in this last case he will have a less chance of the crisis being so perfect, or carrying off the disease.

The only plausible mode of accounting for these critical days, is that which was pointed out by Dr. Cullen, in a clinical lecture he gave about the year 1797; to wit, that continued fevers observed in some degree the types of intermittents.

He said, that during the first week of a continued fever it observed the quotidian type; that in the second it observed the tertian type, and in the third week the quartan type: that is to say, that in the first every day's paroxysm increased; by which is to be understood, that the third paroxysm was greater than the second; the symptoms of the fourth were more severe than those of the third, &c. that in the second week there was a stronger exacerbation one day, and less strong the next day; that in the third week there was a strong exacerbation on one day, on the two subsequent days a weaker exacerbation, and that on the beginning of the fourth day, counting exclusively, a stronger exacerbation again took place.

Again,

Again, he said, that it often happened in intermitting fevers, that a paroxysm occurs every day, but that the paroxysms were unequal: the paroxysms every other day being flighter, every other day more severe; or that they might begin at other times of the day.

In other words, supposing a severe paroxysm, after the intermittent was formed, took place on Sunday at noon, a paroxysm might take place on Monday, which might be either at noon, at ten or eleven o'clock in the morning, or one or two in the afternoon, but less severe: and again, that on Tuesday a stronger paroxysm took place at noon, similar to that which took place on Sunday; and that a flighter paroxysm might take place on Wednesday similar to that which took place on Monday.

Such cases he called double tertians: they were also called double tertians by many of the ancient Greek and Roman physicians,
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and likewise by practitioners after the revival of the science of medicine in Europe.

In such cases, Dr. Cullen observed, that the severe paroxysms were shorter, and productive of more perfect crises; if therefore the continued fever should be governed by a tertian type in the second week of the disease, that then the paroxysms, or exacerbations, might recur every day, but be more strong every other day, and terminate with a more perfect crisis, they might be so short, and terminate with such a perfect crisis; as entirely to carry off the disease.

In like manner, if a continued fever observed a quartan type, and there were two slight exacerbations after a severer one, followed by two slight exacerbations, and then again a severer exacerbation, and so on, there was a greater likelihood of the severe exacerbation being the shortest, and followed by a more perfect crisis, and often by so perfect a crisis as to terminate the disease.

Connecting this idea with what has been said above, a continued fever observes the
quotidian

quotidian type in the first week. If a crisis takes place after the first two or three exacerbations, the disease recurs, and becomes an intermittent fever. But if it goes on as far as the fifth day, and a crisis should take place on the fifth day of the disease, that crisis would terminate the fever entirely: the same thing may be said of the sixth day; but these two days seem to be uncertainly marked as critical days, complete crises happening on them very rarely.

If the first paroxysm of the tertian type should take place on the seventh day, then there would be a chance of a crisis on that day; and in consequence, on the ninth, eleventh, and thirteenth days.

As far as is known, there is no reason for believing that the fever changes its type more frequently on the seventh than upon the eighth day; and therefore if the fever changes its type on the eighth day, the eighth, tenth and twelfth would become the critical days in the second week, and according to Hippocrates would be spurious critical days. Hippocrates

crates accordingly says, that if you find a severer attack take place at the beginning of the seventh day, and go off with some critical symptoms, such as moisture on the skin, greater cleanness of the tongue, &c. then you are to conclude that the seventh, ninth, eleventh and thirteenth days are the critical days of the second week. If a stronger exacerbation should take place on the sixth or eighth days, followed by critical appearances, as have been above observed, then you are to reckon the eighth, tenth, and twelfth the critical days of the second week; and so far, according to Hippocrates, the critical days are the days of the stronger exacerbations of the tertian type in the second week.

If again the fourteenth day should be the first day of the quartan type, then there would be greater disposition to crisis on that day. Indeed the fourteenth day is by much the most common day on which a crisis takes place. If the fever was now observing a quartan type, the fifteenth and sixteenth days being days of weaker exacerba-

tions, there would be little chance of crisis upon them; on the seventeenth day there would be a stronger exacerbation according to the quartan type, and in consequence a greater disposition to crisis; on the eighteenth and nineteenth days, there being weaker exacerbations according to the quartan type, there would again be less chance of crisis upon these days; but on the twentieth day, there being a stronger exacerbation again, according to the quartan type, there would be greater chance of crisis upon that day. This doctrine will by no means agree for the twenty-first day, which it is more probable that Hippocrates, and the physicians of his time, reckoned the critical day, instead of the twentieth, because it was an odd day, which they considered more fortunate than an even day. This whim was probably the ground of their considering the seventh, ninth days, &c. as being the true critical days, and the eighth, tenth, &c. as spurious critical days.

In compliance with this idea, some of those authors who have admitted the fourteenth

teenth as the most common critical day, as it has actually been found in practice, have called it an odd day, because it was the second seventh, and so have perhaps likewise admitted the twenty-first among the critical days as the third seventh.

The truth of this doctrine may also be supported by what happens in hot and in cold climates.

It has already been said, that crisis much seldomer take place in cold climates than in hot climates; and also that fevers are much oftener intermittents and remittents in hot than in cold climates: it is much more probable, therefore; that as intermittents are governed by types, that types have a greater power over continued fevers likewise in hot climates than in cold ones. This perfectly accords with Dr. Cullen's doctrine.

It has already been said, that not above one third part of the fevers which happen in London are terminated by a crisis; that
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is to say, in not above a third part of the fevers which happen in London, does a much stronger attack take place in the evening than took place in the evening of the civil day before, and kill the patient, or otherwise terminate with so complete a freedom from the disease before eight o'clock in the morning, as to render him, should there be no relapse, perfectly safe.

In cases in which no actual crises take place, still it happens sometimes, but not always, that there are stronger exacerbations every other day in the second week, and every fourth day in the third, in regular fever happening in this country.

By the end of the seventh day the fever has often increased to nearly its greatest height, when it is regular. The second week is sometimes gone through without very distressing symptoms, and sometimes cases with symptoms of the greatest distress and danger occur ; and there are all gradations between these extremes.

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It is necessary that the author should here observe, that he has been describing the disease and its progress, when it has not been increased, or rendered irregular by imprudent practice.

The appearances, then, in the second week are sometimes frequency of the pulse, to perhaps an hundred, or an hundred and five, in the evening; and in the morning from ninety-five to an hundred. In many cases of fever the pulse is much more frequent, but this will be described as an irregularity in a future dissertation.

The tongue is covered with a brownish fur, which is not slimy, excepting when putrefaction takes place, as has already been described. When the disease is severe, it is not uncommon for the middle of the tongue especially to lose this fur, and appear, when moist, cleaner and rawer than it is in its natural state, and, when dry, with a degree of polish, as if it were glazed over.

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The eyes have always, provided the fever be regular, a degree of confusion; but it is greater or less as there is more or less delirium, as has already been described. The skin is of a dirty dusky colour; this symptom is in a greater or less degree, according to the violence of the disease.

The head-ach is often less complained of by the patient, but this appears rather to depend upon the confusion of the mind than on the head's being actually relieved.

The appetite is often totally lost. The patient frequently complains less of thirst during the second than during the first week; but this want of thirst seems rather to be from the confusion of the mind; for sometimes, especially when the fever is very violent, he will drink a great quantity at once, and at other times, in the same circumstances, will hardly drink an ounce. The skin continues very dry and parched, that is, feels very hot and dry to the bystander.

The urine continues perfectly transparent, as has been described.

There are flatulencies in the intestines, generally with costiveness; but now and then there are one or two thin and very foetid evacuations in twenty-four hours, even when there is no other appearance of putrefaction.

The sleep, when the patient gets any, is more or less quiet, partly according to the delirium, and partly according to the general restlessness.

If the fever should be slight, and perfectly regular; if the practitioner has patience, and does not press the patient with improper remedies, nor the by-standers with improper nourishment, this stage of the disease passes over with tolerable tranquillity. On the other hand, if the delirium, and other symptoms of fever, be very violent, it proceeds with the utmost anxiety to the practitioner and danger to the patient. This happens in all gradations, from the most severe and fatal to the slightest.

Provided

Provided there has not been such a depression of strength as to occasion putrefaction of the fluids, and by that means to destroy the patient, and that neither of the kinds of delirium which have been described should prove fatal; or provided the patient should not be destroyed, by strong symptoms of fever taking place at the beginning of a critical paroxysm; and the delirium, if of the first species described, keeps pace with the other symptoms of the first stage; or provided it be of the second species, if it begins to be converted into deafness and stupor: and provided, that the fever was of itself perfectly regular, and, lastly, that it has not been rendered irregular by improper treatment, it rarely happens that it is dangerous after the second week.

On the fifteenth day, and often sooner, the symptoms of the disease begin to abate. The first appearance of this abatement is not uncommonly a cleanness and healthy look about the edges of the tongue; or sometimes the skin becomes of a more natural colour; sometimes, although not

very generally, a sweating takes place all over the body, and the skin afterwards continues moist. The delirium, if it be of the first kind, abates in the day-time, and returns at night; if of the second kind, the patient is deaf and stupid, with little difference in the twenty-four hours; and this deafness and stupor remain until the whole of the disease has disappeared.

The depression of strength generally goes off, but leaves real weakness behind; this is not in any case more conspicuous, than when the depression has been so great as to occasion putrefaction of the fluids. In this case, all the appearances of putrefaction which have been already described begin to disappear; that is to say, the tongue is no longer covered with slime, nor the teeth buried in it, but generally looks raw, if moist, and with a polished gloss on the surface when dry; the marbling goes off from the skin; or, if there were any purple spots, these become yellowish and disappear; the breath and secretions no longer are foetid, nor bear any other marks of putrefaction. This
diminution

diminution of the appearances of putrefaction does not happen at once, excepting a crisis should take place, when they go off almost entirely in one night.

It is to be remarked, that in the second week of the disease it often happens, that an eruption takes place on the skin quite different from that marbling, or those purple spots, which arise from the putrefaction of the fluids. This eruption sometimes happens even in the first week of the fever, but much more commonly in the second week of the disease. It occurs principally about the neck and breast, and resembles very much the appearance of flea bites; that is, there are a number of small brownish red specks, often not the twentieth part of an inch in diameter, with a brownness of the surrounding skin. How or why this eruption takes place the author could never satisfy himself, and perhaps it is of no great importance, since the course of the fever is not at all altered by it. The fever is neither increased nor diminished by its appearance, nor any ways apparently altered; neither is

there any increase, alteration, or diminution of the fever, upon its going off, which it does commonly in a few days.

There is also another kind of eruption, which does not commonly take place before the third week of the disease, and more frequently when there have been symptoms of putrefaction in the first and second week. This eruption consists of excrescences, something like warts, but of less diameter, and greater height from the skin, of a blackish colour, and pretty fine texture. The author has likewise not been able to discern any cause of their taking place, or any consequence arising from them, either in the appearances of the fever itself or otherwise, to the patient. This eruption is much less frequent than the one just described. The eruptions are not nearly so numerous, nor are they dispersed all over the body. These seldom appear before the end of the second week. They go off, or rather the excrescences drop off, about the middle of the third week, without any increase or diminution of the disease.

To return to the abatement of the disease in the third week : the urine deposits sometimes a copious lateritious sediment for a day or two, and afterwards returns to its natural appearance. Sometimes there is a copious lateritious sediment in the urine made in the night time, and a mucous one in that made in the day time. The costiveness goes off, and the fœces return to their ordinary appearance. The eyes, unless when the delirium has ended in stupor, begin to have a more healthy appearance, are more composed, and express a greater attention to the objects around them. All the secretions become gradually increased, not equally, but sometimes one more and sometimes another. The sleep returns, but not equally, the patient sometimes passing a tolerable, at others a restless night. There is sometimes a greater degree of thirst than was expressed in the second week. The appetite returns, although seldom regularly; sometimes it is voracious, but the patient is notwithstanding satisfied with a very small quantity of food; in other cases it returns very slowly. The depression of strength sometimes goes

off almost at once, and what is singular, leaves the patient with a greater feel of weakness. Thus the disease goes off, and the patient recovers his strength very quickly.

The cases, in which relapses take place, will be described in that dissertation which will treat of irregular continued fever.

The author comes now to lay before the public the treatment of a regular continued fever.

It has been stated, that in the ordinary course of a regular continued fever there are two means, by which the patient may get clear of the disease and recover, without the aid of medicines. One of these means is crisis, which terminates the disease most commonly in the second or third week, in less than twenty-four hours. The other is, the disease beginning to diminish after the fourteenth day, and going off of itself without any marked crisis. If either of these means of the disease terminating, by the efforts which arise in its ordinary progress,

progress, always took place, the practitioner would, in that case, have nothing further to do, than to take care that the patient should be supplied with proper nourishment to support him through the disease, and prevent any accident which would destroy him.

It has also been observed, that sometimes depression of strength, sometimes the attack in the critical paroxysm, sometimes the delirium, even when it keeps pace with the other appearances of the disease, is fatal.

There arises, therefore, a question, whether fever is to be left to itself, to go through its ordinary course, or whether means are to be taken to carry it off, and what these means are.

In considering this subject, it is evident, that if there was any medicine that would certainly carry off the fever immediately, or soon after its exhibition, and would act equally and certainly in all fevers, it would be infinitely better to employ such
medicine,

medicine, and immediately relieve the patient from the pain and uncertainty of the disease, than allow it to pursue its course.

It is true that any attempt to carry off fever has been reprobated by many practitioners of great experience. Many practitioners have believed that some humour, that is to say, some noxious fluid, or, to give the doctrine its full scope, some noxious solid or vapour, had, by some means, got into, or had been produced in the body; and that fever was only an exertion of the body to destroy or evacuate this matter, or convert it to an innoxious or useful substance.

The author never read or heard of any experiments, by which any such noxious matter was proved to exist. It appears, indeed, that sometimes a degree of putrefaction arises in the body, but this has been already sufficiently considered.

In the next place, the author has already observed, that all fevers produce some substance, which, applied to the body of a
man

man in perfect health, had a tendency to produce, and actually has produced fever in many cases ; but he has also endeavoured to shew, that this infectious matter has no influence on the fever when it has once been produced.

In practice it is found, that if a person, ill of a fever, has that fever terminated, in consequence of medicines employed, the fever does not return, nor does any other disease take place.

It is exceedingly difficult to argue on the negative side of a question. If a man in any science makes an assertion, it behoves him to bring some proof of such assertion. This has unfortunately been very rarely the case ; in medicine a man has very often taken his own whim as the truth, without bringing any proof. If there be actually any noxious substance in the body, why have not those practitioners, who have said there was, pointed out its properties ? Is it solid ; is it fluid ; or is it in vapour, in the heat of the human body ? Is it red ; is it yellow, or is it blue, or any mixture
of

of these colours? Is it hard or soft? Has it any taste or smell? What is its specific gravity? Have its effects been investigated in mixing or combining it with various other substances? If those who suppose such matter to exist, have not shewn that it can be investigated by any of these or other qualities, it is a mere phantom of their own brain.

It has been a common assertion, that although you are not able to demonstrate it by any such quality, yet it cannot be demonstrated that it is not. As well might they say, that the moon can not be demonstrated not to consist of cream cheese.

So far, therefore, in treating a patient in fever, this idea of humour is to be totally neglected.

Since so many practitioners of eminence have assumed the idea, that there is some humour or matter in the body, it may be worth while to enquire into the origin of such belief.

In

In fever itself, there is only one appearance which can give any shadow of probability to such a doctrine. This is, if a crisis should happen in a fever, which appears to be a continued one, on the first, third, or fourth days of the disease, it commonly returns and continues as an intermittent. If a crisis should take place soon in the beginning of the second week, and not be quite perfect in itself, relapses frequently take place. If a crisis should take place towards the end of the second week, it is seldom that the fever returns, although the crisis should not be quite complete. In the third week of the disease, if any thing like a crisis should make its appearance, the disease almost always goes off.

It has been said, that this depends upon an effort of nature to throw noxious matter out of the system. That, at the beginning of the disease, this matter is not concocted, and that the effort of nature is premature. That therefore the matter remaining, occasions the fever to return, and to become an intermittent. That when the

crisis does not take place till towards the end of the first, or beginning of the second week, the matter is more concocted, and therefore nature, by her efforts, throws off a larger quantity, and there is not enough left to occasion an intermittent, but a sufficient quantity sometimes to occasion a relapse. That if nature does not make an effort to produce a crisis till towards the end of the second or third week, the matter has been so far concocted, that it is in no way longer capable of reproducing the disease. The author can only consider all this as a repetition of the same facts in other terms.

What is nature? Is it a discerning being? If it is, it is very much mistaken when it tries to throw matter out of the body before it is concocted. Nature indeed is a word so vague, and is applied in such ambiguous and various ways, that it is impossible it should be understood. It is a term under which men are always inclined to hide their ignorance. The author is not disposed to point out the various ways in which it has been used; he refers his readers

ers to Lord Bacon; he only means here to endeavour to point out the meaning, as far as he can judge, in which it has been taken by those, who have said that she endeavours to produce a crisis in fever before matter is concocted.

A man is born with few or no ideas; whether with any or no is a proposition the author does not mean to argue. When he comes into the world, his eyes open, objects form pictures on the retina, and by degrees impress ideas on the mind. It has been said, that nature produced these ideas; in that case, it would undoubtedly be perfectly superfluous that pictures should be painted on the retina. The same thing may be said of all the other impressions made on the other organs of the senses. A man, when he is born, has his teeth formed in his jaw-bone. If after the proper time of his receiving nourishment by sucking the breast of his mother, the teeth rise up, and cut through the gum, it has been said that nature made his teeth rise up, when it is necessary to cut through solid food.

food. It is undoubtedly the Almighty, who cannot err, that made this contrivance, and not nature, a secondary, fallible, and imaginary being.

In like manner, in inflammation a quantity of fluid is extravasated into the cavity or cavities of the inflamed part; this matter, so extravasated, is converted into pus, destroys the part originally inflamed, makes its way externally, and is evacuated out of the system, leaving a cavity, which is afterwards filled up by granulating flesh; a fresh skin is formed over this, and the granulating flesh is converted into parts similar to those which were destroyed. This surely was a contrivance of that Being, who in his infinite wisdom created all things. Why should we transfer it to a secondary imaginary being?

So in fever, the author has endeavoured to shew, that when the attack of fever takes place, it is followed by a hot fit; that the operations of the body which take place in the hot fit, have a tendency to carry off
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the derangement which had taken place in the cold fit. So it has pleased the Almighty to give powers to the human body capable of producing a crisis which carries off the disease. Why should there here be introduced such an imaginary being as nature, to make blunders, not knowing when some other imaginary substance has suffered an imaginary change? Is it not much easier comprehended, that the body is so constructed, that in all paroxysms of fever an effort is produced to carry off the disease, although that effort does not always succeed?

Nor do other efforts always succeed that the Almighty has pleased to give to animated beings. All seeds of plants attempt to grow; not one in a million succeeds. A single cod fish lays three thousand eggs in a year; not three of these produce cod fish which arrive at maturity.

It is not therefore singular, although the Almighty has chosen so to form the human body, that every attack of fever should pro-

duce a hot fit, in which operations of the body arise which tend to carry off the disease, that these operations do not always succeed. Is it then necessary to have any reference to a secondary and imaginary being, who may make a blunder, and try to carry off matter before it is prepared for it?

The fact is, that a fever begins gradually, increases to a certain point, continues in that degree for a certain time; afterwards, if the patient is not killed in the manner already mentioned, or cured by a complete crisis, it gradually diminishes, and goes off without any cause which has as yet been discovered.

To return to the consideration, whether a fever should be left to itself, without the practitioner employing any means to carry off the disease, but only attend to the patient during the progress of it; or whether he ought to employ any remedy to attempt to carry it off, either by producing a perfect crisis, or by carrying off the disease, without any attention to
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the natural crisis by which it is frequently cured.

The first thing which influences the practice is, what remedies have been found out, by which a perfect crisis may be produced, or the disease be carried off, without any attention to the natural progress or cure of it. The first thing that is of moment in attending to this proposition, is the efficacy of such medicines as have been employed for the purpose of shortening the duration of fever, without having any attention to what happens in its ordinary course. Whether actually more fevers have been cured, and the patient has perfectly recovered when such medicines have been employed, or when the fever has gone through its ordinary course.

This question is exceedingly difficult to determine, from the very great inaccuracy of the evidence of medicine; an inaccuracy so great, that the author has no means of determining the question. It is true that, besides his private practice, he has been

physician to an hospital, which receives nearly four thousand patients in a year, for upwards of twenty-five years; and in which hospital fevers are diseases which patients labouring under are always admitted in preference. There is almost always, also, febrile infection, which frequently produces fevers in this hospital, notwithstanding the utmost precaution to keep it clean and well aired. He therefore might be supposed to possess sufficient evidence, whether a regular continued fever more frequently terminates in patients being restored to health, when they are left entirely to themselves, excepting for the attendance given them, their receiving proper nourishment, and other attentions during the progress of the disease; or whether a greater number recover, when means are employed to shorten the disease. It must be observed, however, that those people brought into the hospital already afflicted with fever, have had that fever disturbed, by remedies employed before the patients are received into the hospital. This cannot generally be found out. These fevers are besides rendered irregular by the motion

motion and fatigue of bringing them into the hospital. Those who catch the fever in the hospital are often ill of other diseases, the symptoms of which diseases are so intermingled with the fever, as to render it perfectly irregular. From these causes the author has not been able to discriminate, with any degree of certainty, what number of patients would recover, supposing they were taken ill of a regular continued fever, and supposing it was to pursue its ordinary course without the assistance of medicine.

In the second place, the practice of medicine is so unfortunately constituted in this country, that when a person is taken ill of any disease, he generally does whatever the first violent man he meets with tells him is proper to be done. Or he applies to mercenary practitioners, whose real business it is to mix medicines according to the prescriptions of physicians who are supposed to have studied the art, without those practitioners being able to distinguish whether the cases are the same. Supposing, therefore, that

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physicians were even very perfect in the knowledge of fever, the disease is commonly totally deranged before it comes under their inspection. If they were to endeavour to lay down the evidences by which it might be determined, whether a regular continued fever, in pursuing its ordinary course, would more frequently terminate in health, supposing it was left to itself, the practitioner attending only to giving the patient proper food, and taking care that those other things, which are called non-naturals, to wit, sleep, secretions, &c. be properly administered; or whether he would more frequently recover when medicines were administered, it would be hardly possible, without such a formula, as the author has already pointed out, in the *Medical and Chirurgical Transactions*, to determine the question with any degree of accuracy.

It is further to be lamented, that where this difficulty does not take place, as it certainly does not in several parts of Europe, where the practice falls entirely into the hands of physicians, no sets of comparative

parative cases have been recorded. These physicians have not pointed out whether the disease, in pursuing its own ordinary course, those things which have commonly been called non-naturals having been only attended to, has oftener terminated in health, than in such cases where medicines have been employed to carry off the disease. Physicians have been too often more anxious to recommend some favourite practice or medicine, than, divesting themselves of all prejudice, to endeavour to render medicine as certain a science as it will admit of.

Such being the situation of the subject, how can the author determine whether, supposing fever was perfectly regular, it would be better to let the disease go through its whole course, or endeavour to carry it off by medicine. It is therefore left to him to shew how to conduct the patient through the disease, supposing the fever perfectly regular in itself, and that nothing has as yet been discovered, which will carry off the disease at once, and in the second place, to consider what are the powers of the medi-

cines, which have been supposed to produce a crisis similar to that which takes place in the ordinary course of a continued fever, as has already been described; or carries off the disease, altogether dissimilar to those which put an end to it in its ordinary course.

The first argument, therefore, to be pursued, is, what attentions are to be paid, supposing we are to do nothing that shall prevent the fever from going through its ordinary course.

The first attention to be paid is to the situation of the patient. Man evidently was originally an inhabitant of a warm climate only. In such a climate, he wants no more covering to defend him from the inclemency of the atmosphere, than what he was born with, or afterwards grows upon him. He was probably driven into colder climes by war, and in colder climes he began to have more vigour; still, however, it was necessary for him, even in perfect health,

health, to defend himself by external cloathing, and, when without exercise, to give heat to the atmosphere, by various means which he had invented, particularly by the burning of fuel.

A man affected with fever has the powers of his system depressed, and therefore cannot defend himself against the cold of the atmosphere. Besides, a degree of cold greater than a man has been accustomed to contracts all the external vessels, and therefore prevents that relaxation which ought to take place in the crisis, and of consequence tends to prevent a crisis from taking place. It also tends to render the diminution of the disease in the morning less considerable. On these accounts, a man in a fever should not be suffered to remain in too cold an atmosphere, or any other medium of too small a degree of heat.

The heat of the surrounding bodies has a different effect on the human body, according to the degree of heat it is accustomed
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to bear. If a man is accustomed to live in a heat of ninety degrees of Fahrenheit's thermometer, he will feel surrounding bodies, heated to seventy degrees, extremely cold; he will feel them as cold as a man, accustomed to live in seventy degrees of heat, will feel a medium that he is in, if it be of sixty degrees; therefore, in defining the heat in which a man should be kept in a fever, reference must be had to the country he is in. In London, in the summer, an atmosphere, heated to sixty-five degrees, will not do mischief from being too cold. In winter, an atmosphere heated to fifty-five degrees, will not be noxious from its cold. In other climates different rules will take place; what these rules are, the author cannot accurately lay down. He conjectures, however, from what information he can procure, that in the warmest climates eighty degrees would not be noxious, from its cold in the atmosphere, and that in the coldest climate less than fifty degrees would be hurtful.

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There is a great difference, however, in the degree of heat which the atmosphere should have, and the degree of heat of which the substances immediately surrounding the body ought to be.

The atmosphere is often only applied to the face, and drawn into the lungs, especially when a man is in bed. The face has been accustomed to various changes in the atmosphere, and whatever part has been accustomed to such changes is much less affected by them. With respect to the lungs, the atmosphere is tempered in its passage through the nostrils, mouth and throat, larynx, and the beginning of the trachea, so that it cannot go so cold into the lungs as to affect them much from its temperature. Moreover, there is in the atmosphere about a fourth part of a vapour, which we call pure air, which is necessary to be applied so as to affect the blood in the lungs, to give the necessary vigour to the system. As in a fever there is a greater depression of strength, it certainly ought not be otherwise depressed, from a sufficient quantity of pure air not being

being thrown into them. As the warmer the air of the atmosphere is, it will be more rarefied, therefore a less quantity of pure air will be contained in the same volume when the atmosphere is warm ; a little greater degree of coldness of the atmosphere thrown into the lungs will be counterbalanced by a greater quantity of pure air giving vigour to the system. On these accounts, the atmosphere in which the patient is may be colder than the bodies which immediately surround him.

With regard to the bodies which immediately surround him, their heat should be much superior to the heat of the atmosphere, in order that they may not do mischief, by producing contraction, thereby increasing the fever, and preventing relaxation and crisis from taking place. In this country, the heat of bodies immediately surrounding the patient should never be less than seventy-five in winter, or eighty degrees in summer.

The next thing to be attended to is, how this temperature of the atmosphere, and
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likewise the temperature of the bodies immediately surrounding the patient, are to be kept up.

In the first place, if the atmosphere be of too cold a temperature, its heat ought to be increased by some means which will not diminish the proportion of pure air in it, nor introduce into it any noxious vapour, or any noxious fluid, or solid, floating in it in small particles.

According to the means which men have of procuring conveniencies, either in sickness or in health, different measures ought to be, and where the means are not sufficient must be pursued, according to what can be afforded.

If a man has sufficient means, the best mode of warming the atmosphere is, to allow the air to enter into vessels surrounded by boiling water; afterwards to pass into vessels cooled by any means to at least sixty degrees of Fahrenheit's thermometer, there being in these vessels a means of allowing
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any water condensed to pass off, without any communication between the vapour contained and the vapour of the external atmosphere. The air should then pass from these vessels into another set of vessels, surrounded by boiling water ; and from these the air, so heated, should enter into the bed-chamber of the patient, so as to keep its heat up to the degree which has been pointed out. The advantage of this apparatus is, that all the water which was suspended in the air of the external atmosphere will be dissolved in it, when it is drawn into the vessels surrounded by the boiling water, as hot air dissolves a much greater quantity of water than cold air. When the air is carried from the vessels surrounded by boiling water into the vessels cooled to sixty degrees or under, the sides of these vessels will cool the air next to them, and precipitate the water dissolved in it as the air passes along, and all of it successively comes in contact with the sides of the cold vessels. All the water which cannot be dissolved in the air in the heat of sixty degrees, or whatever less degree of heat is applied, will

will be precipitated, and carry along with it all other noxious solid, or fluid particles, which will pass off along with the water in the apparatus applied for that purpose; and thus the air will be left pure. The air warmed by the second set of vessels surrounded by the boiling water, may be let into the bed-chamber of the patient, in such quantity as to give the proper degree of heat.

Such would be the most perfect means of warming the chamber of a patient afflicted with fever. It is in the next place necessary for the author to state, how, when such means are not in readiness, heat may be produced in a proper degree.

The first thing to be attended to is, that the mode of producing heat shall not diminish the proportion of pure air in the atmosphere, nor introduce any noxious vapour, or any noxious fluid, or solid particles floating in the atmosphere. Therefore no fuel, for the burning of fuel is the common mode of
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producing heat, should be burnt in the room, without all the vapours arising from it being entirely carried off. For besides that the burning of fuel destroys a quantity of pure air, and renders it totally unfit for respiration, and therefore would oblige the patient, whose strength is already too much depressed, to make deeper or more frequent respirations, so that his strength would be further exhausted; there are also very often noxious substances, vapours, or small particles of solids or fluids, produced by the burning of fuel. If there be, for example, pyrites or arsenical ores in the fuel, volatile vitriolic acid, calx of arsenick, and other noxious matters, will be mixed with the atmosphere which the patient breathes. From this consideration, the rooms in which the patient afflicted with fever is, should never be heated by fuel burnt in a chafing-dish or brasier, or any other contrivance by which the whole of the vapour arising from the burning fuel is not entirely carried off.

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Moreover, if the fuel be burned in a stove or furnace in the middle of the room, or any where where the vapour arising from such metallic substances is not entirely carried off, two mischiefs will arise. In the first place, a calcination of the metal will destroy the pure air, and leave the atmosphere, which the patient is to breathe, with a less proportion of it; by consequence, will render it necessary for the patient to make more frequent and fuller respirations, in order to take the same quantity of pure air into his lungs; it is therefore necessary that no such apparatus be used. In the second place, it often happens that noxious vapours arise from metallic stoves, in which fuel is burnt, which are pernicious. If, however, a stove or furnace, containing the burning fuel, is constructed of porcelain, or any other substance not altered by heat, neither of these causes of mischief will arise. If the outside of any such stove was to be heated to a much greater degree than that of boiling water, then indeed the particles of animal and vegetable matter, which often

float about the room, falling upon the surface of a stove, would be rendered emphysematic; would burn, and so contaminate the air as to render it noxious when respired. The author does not otherwise see any objection to heating the air of the bed-chamber when necessary, by a stove or furnace, not apt to be at all decomposed or altered by heat, if the heat of the external surface of such stove or furnace is always kept under the heat of boiling water.

If the chamber be kept heated by fuel burning in a grate, or open fire-place, where all the air serving for the burning of the fuel, together with all the vapour arising from the burning fuel itself, is carried off by a chimney; there certainly can no objection arise from the diminution of pure air in the atmosphere, or from noxious matters thrown into it. The only question with regard to the heat produced in this way is, whether it be diffused perfectly equally all over the chamber of the patient, or at least over that part of it in which the patient is. If it be so
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equally diffused, no mischief can arise; but if cold air should be drawn into the room, in such manner as to pass over the patient, then indeed this mode of heating the room would have all the bad effects that have been above enumerated, as arising from the patient being exposed to too cold an atmosphere. Attention should therefore be paid, in this case, that no stream of cold air be allowed to pass over the patient.

These are the means which have been practised to heat the atmosphere surrounding the patient by burning fuel. The author is not acquainted with any means of generating heat in the patient's bed-chamber preferable to burning fuel.

The next means of keeping the patient in a proper degree of heat, are the modes of heating the substances immediately surrounding the body, as well as the air of the atmosphere. For this purpose, it is much better that a patient should be kept in bed, where the heat is more equally diffused all over his body, than when he is in the ordi-

nary cloathing he wears when out of bed. There are other more cogent reasons for keeping him in bed in fever, which will be afterwards enumerated. Supposing, then, that a patient should be seized with fever, and that he is immediately to be put to bed; if the bed itself is not perfectly dry, it should be dried and heated before a large fire, and clean sheets are to be laid upon it, which are also to be properly warmed, as are the other coverings. The bed should by no means be heated by any hot substance, such as a warming-pan, which, if there be any moisture about the bed or bed-cloaths, raises that moisture, which does a great deal of mischief to the patient, as will afterwards be explained.

After the patient is in bed, the heat of the bed-cloaths, or substances immediately surrounding him, can only be kept up by the heat generated by the patient himself. All that can be further done, if it be necessary from the heat of the external atmosphere to warm them, is, that they should be kept warmer, by forming them of substances
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which communicate heat with difficulty, and therefore confine the heat generated by the patient. It is likewise necessary that the strength of the patient should not be exhausted by exertion. In the first place, the bed which is under the patient should be of soft feathers, which were better loosely quilted, that they may be firm enough to give support without giving way, and at the same time sufficiently loose to be very bad conductors of heat.

The author must here remark, that he is giving the best directions, as far as his judgment goes, knowing at the same time that they cannot be always perfectly complied with. Yet it is necessary that the best should be known, so that they may be come as near to as possible. Some have thought that the bed had better be a mattress, formed of wool or hair, firmly quilted. This the author conceives to be part of that superstition, which inclines men in health to believe, that it is a meritorious act to give themselves pain.

In fever, the body should certainly be supported by substances, which make its own weight less disagreeable to the patient. Although this observation belongs to another attention during fever, what is now treated of being only the heat surrounding substances. Under the circumstances at present under consideration, the heat is not to be lost by the patient's being laid upon good conductors of it. Upon these general principles the following directions are laid down. The covering over the patient ought to add to the quality of not conducting heat readily, that of being of very little weight. The immediate covering of the patient should be cotton cloth; that is, his shirt and sheets, as being less apt to conduct heat than linen. The author mentions, in the first instance, that which is the best without regard to expence. Therefore, an eider down covering, quilted in some thin material, is the best. Nevertheless, although certainly pressure of bed-cloaths ought to be avoided, as supporting that pressure is an exertion of the powers of the body, there is something

thing in the habit of bearing pressure greater than such slight covering, which the author is not sure might not counteract the convenience of its lightness. At any rate the covering which goes over the sheets should be, where it can be had, of the newest and lightest woollen cloths, such as are called blankets ; for the wool of animals is so constructed, as, upon being pressed together frequently, to weave itself into a thick and heavy substance, called felt, which would by no means be a proper covering for a patient affected with fever.

All kinds of cloaths, when moistened with any watery fluid, become much better conductors of heat than when they are perfectly dry. For this reason, if, from the exudations from the patient himself, or in any other way, they should become moist, they ought to be removed, and fresh and dry coverings be substituted in their room. Another reason for removing any of the coverings of the patient when moist is, that the evaporation of the moisture produces cold, and that cold is apt to be transmitted

to the patient, and to produce the mischief which has already been said to arise from his body's being exposed to too great a degree of cold. The cold thus produced is also apt to act more forceably upon particular parts of the body, which have not usually been accustomed to exposure to cold, and therefore is much more hurtful.

Hitherto means have been proposed to prevent the patient's being too much exposed to cold, either of the air of the atmosphere, or of the solid substances surrounding him. The next thing to be taken notice of is, how to avoid too great a degree of heat, either in the atmosphere, or of the solid substances surrounding the patient. This indeed is a matter of much greater difficulty to give directions about, and especially to the author, who has always practised in temperate and cold countries, particularly as few or no attempts have been made in warmer climates to give coolness to the atmosphere, and substances surrounding the patient. He can therefore only conjecture by what means this object may be obtained.

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In the climate of England, the atmosphere is sometimes heated to a greater degree than is convenient in fevers, as has already been shewn. The only way of cooling it that can at all be put in practice is, by the evaporation of watery fluids, which may be produced by sprinkling water upon the floor, and other parts of the bed-chamber of the patient. But then there is danger of the evaporation producing at times too great a degree of cold, or partial cold; the effects of this are somewhat obviated by using, instead of pure water, water impregnated with essential oil of aromatic plants. The author, however, has not much dependence on this, although it feels very refreshing to the patient.

Whenever the patient is in a climate, whose heat is less than ninety-seven degrees of Fahrenheit's thermometer, which is nearly the heat of the body of the patient, removing the air which is in immediate contact, by means of putting the atmosphere in motion by any kind of fan, renders that which is in immediate contact with the
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body much colder than it would otherwise be. Such means, in case of too warm an atmosphere, seem to be very proper to be employed.

It is a question, whether exposure to a stream of air colder than the heat of the human body would be safe. Certainly if that stream of air contains moisture it would do mischief, in consequence of the particles of water, which were before suspended in the air, being dissolved in it by the superior heat of the body itself, and thus producing cold in too great a degree. If the air passing over the patient, under these circumstances, had no water suspended in it, in this case, the author does not apprehend any mischief, excepting there was moisture immediately covering the skin, which being dissolved in such dry air, might produce too great a degree of cold.

The solid substances covering the patient, in case of his being in too warm an atmosphere, ought to be thin; but still, however, bad conductors of heat, such as cotton wove
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thin; for if these should happen to get moist, if they were good conductors of heat, the cold generated by the solution of such moisture in the air, being immediately applied to the patient, might do a great deal of mischief, as has already been explained.

In fever, a patient should avoid all extraordinary exertions; he should be placed, therefore, in a horizontal position, or as nearly so as he is accustomed to when in health; in this position he is supported every where by the bed, and is not obliged to exert any of his muscles, as he is when in an upright posture, to keep the parts in equilibrium. At the same time, great care should be taken, that his mind be kept free from all exertions whatever, and especially all such as produce any anxiety.

In regular continued fever, when severe, the patient is not able to judge of any thing truly; the mind cannot arrange the arguments on each side of a question, so as to draw from them any perfect conclusion, much less can it form a rule for any action; nor, when it has
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formed an opinion of what is to be done, can it imagine the mode in which the effect is to be produced. No advantage can, therefore, be gained, by exciting his attention to his affairs; the force of the system is only exhausted by fruitless attempts. If a regular continued fever should be less violent in its beginning, although a man might attend to his affairs with some effect, yet any advantage gained by such attention would be much overbalanced by exerting the force of the system. As soon, therefore, as a patient is seized with a febrile attack, he should immediately be put to bed, and left under the care of one attendant only, and every thing that can call into action the operations of the mind is to be avoided.

It might be conceived, that the practitioner who was called in to attend the patient, need not be warned to avoid exciting anxiety in the mind of the patient about his disease; it is necessary, however, as there are many practitioners, who, from inattention, make the disease the subject of their conversation in the hearing of the patient.

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It has even been affirmed, by those who wish to vilify medicine, that there are practitioners who, out of a point of vanity, talk learnedly to the patient about his disease; and that there are some who have even wished, by alarming the patient, to fix the disease, and prevent it from being carried off. That this is true the author can hardly believe; he only intends to warn all practitioners not to disturb the mind of a patient; indeed at any time in disease, but more particularly in fever.

The patient being laid in bed, in nearly an horizontal posture, with a proper degree of heat and covering, the next thing to be attended to is, the quality of the atmosphere which he breathes, and which surrounds him.

It is necessary, as has already been observed, that a man should take into his lungs a certain quantity of a vapour, called pure air, which has a certain effect on the system necessary for life. This vapour does not sensibly affect the matter of the body,

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excepting that it adds yellow to the red particles of the blood, which is so altered in the the circulation through the body, that it must pass through the lungs, and from them again into the other parts of the body, in order that a man should exist. This vapour makes about a fourth part of the atmosphere. The whole atmosphere is so mixed together, by the currents which are constantly taking place in it, that pure air is found nearly in equal proportions in almost all situations where the atmosphere does not stagnate; in a room in a private house, or in the ward of an hospital in the centre of such a city as London; in a cultivated or uncultivated country, over the sea, or in any situation where currents of the atmosphere are constantly taking place. In order, therefore, to keep up the due proportion of pure air in the bed-chamber of a patient, it is only necessary that the air should not stagnate.

The next thing to be considered is, whether a different proportion of pure air would be better adapted to the respiration of a patient

patient in a fever, than that proportion which is found commonly in the atmosphere.

It is but lately that the proportion of pure air to the other vapours contained in the atmosphere has been found out; it having been long known, however, that there were various other vapours mixed with it in the atmosphere.

Whenever any new and seemingly important fact has been discovered, and especially if it cannot immediately be applied to any advantageous purpose in mechanical or chemical arts, mankind in general, and very often even practitioners in medicine, conceive it must be applicable to some medicinal purpose. Just as an infant, allured by any thing which glitters in its eye, applies it to its mouth, supposing it must be likewise exquisite food; so infants in medicine are dazzled with any surprising discovery, and immediately employ it for the cure of diseases, not considering how extremely difficult an art medicine is; how fallacious experiments made in it often are, as has been observed
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long ago by Hippocrates, and by what flow degrees valuable medicines have had their powers investigated ; how long it was before the effects of the bark of the cinchona, of mercury, of antimony, were brought to light, as far as they are already known.

The author, therefore, conceives, that in fever it certainly is not at all known, whether the fever will go through its ordinary course better or worse for the patient's breathing an atmosphere having a larger or less proportion of pure air. The other vapours which constitute the remaining three-fourths of the atmosphere, may some of them be noxious, and others of them may be breathed along with the proper proportion of pure air, without any detriment.

As the vapours which constitute the atmosphere are extremely viscid, they suspend innumerable fine particles of various solids, and also innumerable drops of fluids, which are principally water, the effects of which last have already been attended to. Many such substances

substances may be very noxious and very improper for the patient to breathe in health, and still more noxious in disease. That they are very noxious in many diseases is easily seen from what happens in hospitals, in almost all kinds of wounds and ulcers, inflammations and suppurations, in all affections of any of the parts employed in respiration. In all these diseases the patients in hospitals recover much more seldom than in the air even of London, a town at least seven miles long and three in breadth; and in such a town these diseases go on much worse than they do in the country at the distance of ten miles from it.

What are the noxious particles, or vapours, mixed with the atmosphere, which render it so hurtful in these diseases, has not been investigated. The breath arising from the lungs of animals, the vapours which arise from their bodies, the vapour arising from the immense quantity of matter which is constantly putrefying, the vapour which has served for the inflammation of fuel, &c. are all improper for respiration. The particles

ticles of soot, ashes, horse-dung, gravel, and a vast variety of other bodies, floating in the air of a large town, render it undoubtedly improper for respiration; but which of all these small particles, vapours, fluids, or solids, are hurtful in the diseases which have been enumerated, has by no means been investigated by experiment, the only means of investigation which can in the least be depended upon.

However noxious these vapours, which ordinarily contaminate the atmosphere of an hospital, or large town, are in the diseases which have been enumerated, they do not seem to have very bad effects in a regular continued fever. A patient, in a regular continued fever, goes through its course under exactly the same treatment, as safely in St. Thomas's hospital as he does in the country, or in an air in which no noxious particles are known to exist. It is undoubtedly true, that vapour arising from putrid substances depresses the strength, and in so far must be noxious in fever; but when care is taken to avoid such putrefaction,

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and by a proper circulation to keep a due proportion of pure air; infectious vapour, and most other noxious substances, do not seem, from experience, to have much effect in regular continued fever.

Two things must be observed, therefore, in regulating the air of the room in which the patient is confined in such a fever. First, that there shall be such a circulation of the air, or, in other words, such a quantity of air shall enter the room and pass out of it, as is sufficient to keep up the proper proportion of pure air. This must be done in such a manner, as that the fresh air passing in shall not flow in a stream over the bed of the patient, lest it do mischief by its temperature. Secondly, it is necessary that the air shall not be contaminated by putrescent matters. It is much better then that the food, and whatever else is necessary for the patient, should be prepared in an adjacent chamber to that in which he lies, and only the attendant upon the patient should be suffered to remain in his room.

A regular continued fever, if it be left to pursue its own course, continues, as has already been said, for between two and three weeks, if the patient is not lost or if no crisis takes place. A man cannot live for so long a time without some nourishment; it is therefore necessary, in the next place, to enquire what food and drink should be employed during the progress of the disease.

In the first place it is to be observed, that in a regular continued fever there is no time in which the patient is free from the disease, as there is in a regular tertian; those rules, therefore, which have been laid down as proper to be followed in a regular tertian, are by no means applicable in a regular continued fever.

In a regular continued fever no principal meal can ever be employed, as the organs of digestion are always too much deranged to be capable of converting into chyle and blood a large quantity of food of any kind. On the other hand, there is this great difficulty in the ordinary state of the
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body in health, that in man, any interruption to the process of digestion, arising from fresh matter being thrown into the stomach, always interrupts the process, so as to render it much more imperfect, and often induces disorder of the whole system. This is not the case in all animals; a horse is constantly throwing in fresh matter, and the processes are going on notwithstanding very perfectly.

A man is often so far deranged in fever, as to render it in many things necessary to deviate from his ordinary modes of life in health. In a regular continued fever, for instance, the food cannot be thrown into the stomach in great quantity at once, without greatly disordering the whole system, increasing the disease, and rendering it irregular; small quantities only of food must, therefore, be thrown in at a time, and that must be often repeated.

In a regular continued fever, be it ever so slight, no solid animal food ought ever to be employed, whether quadrupeds, birds, reptiles, or insects. Solid animal food, in a

regular continued fever, during its digestion, greatly increases the heat to the feel of the patient, still more to the feel of the bystander, and frequently, though not always, to the thermometer. It produces great restlessness and sense of uneasiness, and an increase of depression of strength in the patient, during the time that it remains in the stomach and intestines. It totally deranges the fever. It often produces the appearance of a fresh paroxysm. If it be made use of about noon, or before the next evening exacerbation, this is almost always rendered more violent. It is true, indeed, that if an error be committed, and solid animal food be employed, after it has passed through the intestinal canals, the system generally recovers itself, the patient only being weakened by the extraordinary exertion, and rendered less able to support himself during the remainder of the disease. If the same kind of food be persisted in, it increases the evening exacerbations extremely, brings on delirium much faster, and in a much greater degree than it would otherwise arise, and prevents the fever from being worn out by its own progress,

progress, as it otherwise would be. All solid animal food is therefore in every case to be rejected throughout the whole progress of the disease.

Even after the disease has been terminated by a crisis, animal food, in a solid state, should be rejected, there being no cause which has produced relapses, as far as the author's observation has gone, so frequently as using solid animal food too soon. Supposing even a complete crisis should have taken place, and entirely terminated the disease, it ought to be at least five or six days before any solid animal food is ventured upon.

The author wishes to press this more strongly ; because if a perfect crisis should take place, the appetite often returns, and the patient is left in a very weak state. It has, in this case, been often conceived by the patient, and much more frequently by the bystanders, that solid animal food would restore his strength soon. It must, however, be remembered, that when a

complete crisis takes place, and carries off the fever entirely, the depression of strength, which was a symptom of the fever, ceases, and the weakness, which was produced by the exertions and derangement of all the faculties in the system, is no longer increasing, and that the patient, with very moderate nourishment, and the sleep and rest which are so apt to ensue after the fever has been completely carried off, will have his strength restored in a very short time, without using any thing that shall run any risk of re-producing the disease.

The same objections arise against the use of such animal fluids as are coagulated by the coagulating juice of the stomach ; such as serum, eggs, and other fluids of the same kind. These become solid as soon as they are thrown into the stomach, and have the same effects in disturbing the whole system, during their digestion, as have been just enumerated to be produced by solid animal food. Milk is a fluid of this kind, being coagulated by the coagulating juice of the stomach as soon as thrown into it.

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We find, that it has been reprobated by Hippocrates, and many other practitioners. This subject, however, will be considered more fully hereafter.

All such vegetable substances, as cabbage, lettuce, green pease, and the like, are to be rejected, on account of their disposition to run into the vinous and acetous fermentations, which the stomach, having its powers depressed by the fever, is not strong enough to counteract. Neither is it able to induce those fermentations which convert the food into chyle. Chyle is therefore not formed from such food, but a considerable quantity of vapour is extricated during the time these substances remain in the stomach and intestines, distending them, and producing spasmodic contractions in them.

In the beginning of a regular continued fever no very great nourishment is required for the present, the system being able to support itself for a time, without any thing being thrown in to be formed into chyle and blood. For in a man in health, what-
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ever quantity of food is thrown in, a certain part of it only is converted into blood. The remainder is either converted principally into water, and thrown out of the body, or into expressed oil, and deposited in the cellular membrane, or what is by some called the adipose membrane. Hence we see that where food can always be had in plenty, and the appetite is such as provokes a person to employ a great deal more food than what is capable of maintaining the proper quantity of blood, if the superfluous quantity of chyle be converted into water, and evacuated, the person remains thin. If, on the other hand, a great part of the superfluous quantity of food is converted into expressed oil, a great quantity of fat is accumulated in almost every part of the body. When more food is used than what is necessary for keeping up the proper quantity of blood, there is always some quantity of expressed oil, and perhaps some other substances formed in the body. These are laid up, as it were, in a reservoir, are absorbed, brought into the circulation again; are converted into blood, and supply
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in a degree the want of proper nourishment.

By what process they are converted into blood is not at all known; but that they are is evident, in as much as a person strong and well nourished does not lose his fluids, and become so emaciated in fever, and in many other diseases, as if he had had less blood in his blood-vessels, and less fat, &c. when the disease first took place.

It has already been remarked, that when more food is made use of than what is sufficient to keep up the quantity of blood in the system, the superfluous quantity is otherwise disposed of. So when a great quantity of expressed oil is deposited in the cellular membrane, it does not supply the place of food better than if a moderate quantity had been so deposited, the powers of the body not being able to make above a certain quantity of expressed oil into blood. Or, in other words, it may be said, that although a man, with a moderate quantity of expressed oil, that is, moderately fat, can undoubt-

undoubtedly support himself in a fever, better than a man who was emaciated when the disease took place, yet a man with a very large quantity of expressed oil is hurt by the absorption, it being increased in consequence of the fever. The power of the system is oppressed by the quantity of expressed oil absorbed, which cannot be converted into blood, and must be converted into water, to be thrown out of the body.

When therefore a man is in a proper state of nourishment when a fever begins, if there is in his body matter which may in part supply the loss of the blood during its progress, it is not proper to disturb the system by exhibiting any kind of food liable to produce this effect in the first days of the disease.

If it could be foreseen when a fever begins, as it may be in many cases, that it would be converted into a regular intermittent in a few days, it would not be necessary to derange the system, by exhibiting any kind of food that might produce any disorder

order in it, such derangement preventing perfect intermissions from taking place. But if it be known, from the rules that have already been laid down, that the disease is more likely to be a continued fever, although no nourishment is wanted immediately, there will afterwards come a time when a much greater quantity of nourishment will be required. The derangement of the organs of digestion is not so great in the first days of the disease, as it comes to be afterwards; so that upon the whole, considering what may happen afterwards, that is to say, how much nourishment will be wanted, it is better not to let the patient sink, but give him as much food, and such food, from the beginning, as will not produce any disturbances from its quantity or quality.

Every kind of food which is adhesive to the stomach when it gets into it, produces considerable disturbances in the system during the time it remains in the stomach; such as strong solution of gum arabic, jellies formed from the meat of young animals, or from the membranous parts of animals

dissolved in water; such substances, therefore, should be avoided. Farinaceous matter, coagulated by heat, and afterwards dissolved in water, forms a food which gives indeed moderate nourishment, but then it is not adhesive to the stomach, does not produce any disturbance in the system in consequence of its solidity, nor is it apt to fall into the vinous and acetous fermentation, and is not therefore acescent or flatulent. Farinaceous vegetable food, if dissolved in water, without being first coagulated by heat, or otherwise, affords a very viscid solution, which adheres to the stomach, and produces great disturbances in the system. We see that the ancient Greek physicians were extremely careful to coagulate farinaceous matter before they exhibited it to their patients, either in a solid form, or dissolved in water, as their *panis biscoctus*, or bread twice baked, the coagulation not penetrating sufficiently through the whole of it on its first exposure to heat. On the same ground they broke down the farinaceous seeds of wheat, and other grains, into small particles, although not quite into flour,

flour, exposed them to heat in an oven until they were browned. So likewise barley water is prepared, by boiling in the first place the barley in water, till it be coagulated, throwing away that water, and then employing a fresh quantity of water, in which part of the barley is dissolved. Such a solution of farinaceous matter in water forms the simplest nourishment in fevers, and other acute diseases.

Solutions of farinaceous feed, thus formed, first by taking off the husks from the feed, then boiling the cotyledons or farinaceous parts in water, afterwards throwing away that water, and lastly adding more water, until part or a whole of the farinaceous matter is dissolved, forms that kind of nourishment which gives the least disturbance during its digestion.

It has been contended by many practitioners, that no other food should ever be employed in a regular continued fever, as they have thought that it is of much more consequence to avoid all disturbance,
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and consequent irregularity of the fever, than to give nourishment in a greater degree. Others, again, have thought it of consequence to give more nourishment.

The next preparation of farinaceous matter is made by forming it into a cake, baking it, and afterwards boiling it in water, until it is not quite dissolved, and so exhibiting it to the patient. Sago seems to be the farinaceous pith of some palm tree prepared in this manner.

The author, in his *Treatise on Digestion*, has shewn, by an accurate experiment, that the same quantity of the same food in a solid form, gives much greater nourishment than when it is dissolved in water; at the same time it is not improbable, that even when it is nearly dissolved, it is of somewhat more difficult digestion than when it is entirely dissolved.

Next to food prepared in the manner which has been already described, the cotyledons of farinaceous seeds, as of barley,
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for example, boiled in water, until they have become very soft, give somewhat a greater nourishment, and have been thought by many a food of quite as difficult digestion as ought ever to be employed in continued fevers. Bread twice baked, which in our language is called rusks, is nearly of the same degree of facility of digestion, and of the same nourishment. Farinaceous seeds, broken down into small particles, afterwards exposed to heat until they are brown, and given either in that state or boiled in water, appear to have been much employed by the ancient Greek physicians, although they are not now in use.

Fruits are of various qualities with regard to digestion and nourishment. Some of them contain a very considerable quantity of an acid, which is evidently capable of digestion, as it corrects the putrescency of animal food, which no other acid does. This shews that it enters into the fermentations of the stomach along with the animal food. This is a subject, however, which it would be improper to argue here,

as fruits, whose juices principally consist in this acid, such as lemons, do not afford nourishment enough to be depended upon in fevers.

Some fruits contain a mucilaginous substance, which is exceedingly apt to fall itself into fermentation, and produce in the sugar, which is found in some quantity in all fruits, the vinous and acetous fermentations, and induce these fermentations in the stomach. These are therefore flatulent and acedent, and of consequence cannot be employed with any propriety in this disease. Cherries, for example, are of this kind. Other fruits contain a great deal of sugar, and hence afford great nourishment, and but little of that mucilage which is so apt to fall into fermentations, are easy of digestion, and may therefore be employed in fever; the principal of these which are cultivated are grapes, figs, and dates, which are all of them agreeable to the stomach, and may be employed along with the preparations of farinaceous matter that have been above enumerated.

While in the recent form, however, the fruits last enumerated contain rather too large a quantity of essential oil to be agreeable to the stomach during the time of a regular continued fever, although the flavour of this essential oil is often very agreeable to a man in health in their recent form. They also contain more or less of a mucilaginous adhesive matter. By drying or exposing them to the heat of boiling water, the adhesive matter is coagulated, and loses its adhesiveness; the essential oil is in a great measure evaporated, and the objections arising from these of consequence got rid of. The mischief, however, arising from the flavour, and adhesive mucilage, is not so great as to prevent them from being employed when recent, if they be good of their kind, especially grapes, provided they be fully ripe.

Another class of fruits contain, besides native vegetable acid, fermentable mucilage, sugar, and generally a small proportion of an adhesive mucilage like gum, and a quantity of farinaceous matter; such as apples, pears, apricots, peaches, and nectarines. In the

tribe of apples there is a large proportion of farinaceous matter and adhesive mucilage; therefore apples and pears may be employed in regular continued fevers; but not unless they have had their mucilaginous substances coagulated by heat, which also destroys, in a great measure, the fermentable mucilage with which they likewise abound. Boiled, baked, or roasted, they may also be employed as food in a regular continued fever.

Peaches, and other fruits of the same kind, when they have been improved by cultivation, contain little else but farinaceous matter and sugar, and may therefore be employed without any previous preparation.

The fruits of the cucurbitaceæ, whether ripe or unripe, are very improper to be employed in regular continued fever, or indeed in any disease where it is necessary to employ food of easy digestion. They contain a mucilage, which falls into fermentations more difficultly than any substance that we know. They resist so strongly the fermentations which take place in the stomach, although

although they be of a loose and flabby texture, as to have remained in the stomach above three days, and to have been thrown up again undissolved and almost unaltered. Of this kind are cucumbers, melons, &c.

These are the vegetable substances employed for food, and the properties which render them fit or unfit to be made use of in regular continued fever, according to the degree of the disease. That is, in a very violent regular continued fever, at the beginning, if the patient be in perfect health and strength, and well nourished, nothing but solutions of farinaceous matter, coagulated by heat, should be given. If the fever is not so violent, although there appear to be no necessity for much nourishment for the present, yet as there will come a time afterwards, when the fever will be more violent, and affect the organs of digestion more, it is better to employ farinaceous matter coagulated, and nearly dissolved again in water, such as sago; or only somewhat softened again by the water, as barley boiled soft, &c. together with such fruits as have been above pointed out.

It has been a question, whether any animal food should ever be employed in regular continued fevers. Many practitioners have contended strongly, that no animal food should ever be given. Animal food, of any kind, is certainly much more apt to disagree with the stomach, to produce a great sense of heat throughout the system, and to render the pulse more frequent, than those vegetable substances which have been enumerated as proper to be employed in regular continued fever. Moreover men may live and be nourished, and their strength perfectly kept up, by vegetable food alone, even when they undergo great labour, or when they use violent exercise. If thus in health food of easy digestion is sufficient to maintain the powers of the body, it is certainly capable of maintaining them in disease, where from the facility of its digestion, a greater proportion of it will be converted into chyle, than of animal food of much more difficult digestion.

Whether it be ever proper for mankind to use animal food, is a question foreign from

from the present dissertation. The question at present to be agitated is, whether animal food should be employed by a patient afflicted with fever. The author is inclined to think, that it is never necessary or proper for the patient to use animal food of any kind in a regular continued fever. The habit of using animal food in large proportion to the whole in this country, England, has induced an idea, that a patient could not be sustained through a regular continued fever without using animal food. This prejudice is so strong, that it is impossible to prevent the attendants on the sick from giving them animal food. It must therefore be considered, what kind will produce the least disturbance in the system.

In the first place, no solid animal food should ever be exhibited to a patient affected with a regular continued fever. Solid animal food, even such as is of the easiest digestion, such as fowls, and white fish of a moderate degree of firmness, as whittings, has been the cause of the greatest

number of relapses when used after a crisis, or by a convalescent, that have come within the knowledge of the author. Of consequence, it must do much mischief during the time of a regular continued fever, by rendering the relaxations more imperfect, and the exacerbations more violent; it ought, therefore, to be by no means used, until the patient has got perfectly free from all appearances of the disease.

If animal food then is to be employed at all, it should be in solution in water. All solutions of animal food in water are not of the same kind. In the first place, there are certain solutions of animal food in water, which contain mucilaginous matter, which coagulates, that is to say, becomes insoluble in water, consequently solid as soon as it gets into the stomach. Such substances are as difficult of digestion as solid animal food, when they are thrown into the stomach, and ought therefore to be rejected; such as whites of eggs, serum of blood, &c. All such substances may be easily known, by heating them to the heat of boiling

boiling water, in which degree they also coagulate.

Milk is a fluid that always coagulates in the stomach, but does not coagulate in the heat of boiling water. It has been generally thought, that this fluid ought not to be made use of in continued fevers. In one part of the works of Hippocrates, it is said simply, that it is bad. In another part, that it ought not to be given, unless the fever is very long. Sometimes the author has seen it coagulate in the stomach so firmly, as to render the patient sick, which sickness brought on vomiting, during which the coagulum was thrown up resembling a tendon. In such cases milk is undoubtedly a very improper food.

Milk consists of a solution of a mucilaginous substance in water, expressed oil, and sugar; there is perhaps likewise a little of the neutral salts of the blood in it. The sugar contained in it corrects any putrescency that might take place in the chyle, rather disposing it to be acescent; and the
expressed

expressed oil being every where mixed with it, prevents it, when it coagulates, from forming so firm a mass, so that although it be always coagulated in the stomachs of children, it digests easier than almost any kind of food, at the same time that it gives them greater nourishment. This would tempt us to employ it in fever, as an animal food of at least easy digestion; and the author is not certain that, notwithstanding it has been condemned by Hippocrates, and the few cases he has seen where it has disagreed with the stomach, that it is very fit to be employed if any animal food is given.

Of the solutions of animal mucilages in water, which are not coagulable by the juices of the stomach, there are none found commonly in animal bodies which give nourishment. They are made by dissolving the solid or coagulated fluids of animals in water by heat. These differ from each other, in forming with water a solution either more or less viscid or adhesive.

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It has already been observed, that every thing adhesive is of extremely difficult digestion, and at the same time produces great disorder in the system during the digestion. All such solutions of animal mucilage in water, as form with the water an adhesive compound, are therefore improper to be employed in fevers. Such are solutions of all parts of young animals, as veal, lamb, &c. and also the solutions of the membranous, tendinous, and ligamentous parts of all animals.

If we, therefore, employ any animal food at all in regular continued fevers, it should be solutions of the muscular parts of animals, which have attained their full growth, as of oxen, sheep, fowls, &c. In making solutions of parts of animals in water, which we call broths and soups, we extract a quantity of expressed oil, which is fluid in the heat of boiling water, generally solid in the heat of the atmosphere. This expressed oil contains the flavour of the animal, which depends probably on an essential oil diffused through the expressed oil. When the whole solution is set to cool, the expressed oil rises
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to the top, and as it cools becomes solid, and therefore may be easily strained off, carrying the flavour along with it, which should always be done before it be exhibited to the patient.

At the beginning of a regular continued fever, when it has attacked a patient in full vigour and well nourished, it is certainly improper to employ animal food in the first week of the disease; when it is given, it ought to be in small quantities at a time. These are the attentions to the nourishment during the continuance of a regular continued fever.

Thirst is often a very distressing symptom of fever: the opinions of practitioners have differed very much with regard to the quantity as well as quality of the fluid to be made use of for drink.

The ancient Greek physicians thought it improper that the patient should drink any thing at all during at least part of the disease, as they conceived that any kind of drink
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increased the fever, and occasioned greater thirst, even water alone. Modern practitioners, with a view of rendering the blood thinner, have forced the patient to drink a much larger quantity of water, or watery fluids, than he would of his own accord.

That the blood is thick, and in consequence obstructs the small vessels in fever, was a doctrine formed by authors, who were not acquainted with the substances of which the blood consists. They did not know that its most essential parts are red particles, coagulable lymph, and serum; that there is besides these a solution of mucilaginous substance, similar to that which is formed where putrefaction has taken place, that there was a solution of natron muriatum, ammonia muriata, and ammonia phosphorata; besides other neutral and earthy salts; and that besides all these substances there is also water, not in a state of chemical combination with any substance, but diffused through them. There is, therefore, a larger quantity of water already in
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the blood-vessels than is necessary to dissolve or combine with any of them.

That it is true that there is water not chemically combined is shewn by this, that when the blood is exposed to some of the fine filters in the body, such as the pores of the skin or the kidneys, water is filtered off, sometimes perfectly pure; but filtration is a process which never separates two substances chemically combined; water then, so filtered off, is not in combination with any of the substances from whence it is filtered.

If more superfluous matter were thrown into the blood than is already in it, it would not render any of the parts of the blood thinner, or capable of passing through vessels it could not pass through before; the only effect of it would be, that when blood came to a vessel so small as not to let any other part of the blood pass through, the water would pass through, and leave the other parts of the blood behind. Throwing, therefore, a larger quantity of water into the blood-vessels would
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not thin any part of the blood that was too viscid, so as to make it pass through vessels that it could not pass through before on account of its viscosity. It is not necessary, therefore, to force the patient to drink more water than he chooses for the purpose of thinning the blood, as no such effect arises from throwing in a larger quantity.

There are many other arguments, by which it might be shewn, that drinking more water than the patient is naturally inclined to do, from his thirst, in no way alters the chemical properties of the blood; that is, those properties which distinguish the several parts of it from one another, or from any other substance; but what we have already urged appears perfectly sufficient.

As it is not necessary or useful to give a quantity of water greater than the patient chooses to drink, so on the other hand, the not giving a sufficient quantity, according to the thirst, seems to have arisen, as far as can be judged, from that superstition, which
has

induced mankind to refrain from things agreeable, to produce some salutary effect; just as men think they will go to heaven, by not eating animal food for two days in the week.

The author then conceives, that the patient should be allowed to drink as much as he desires.

Another question has been much agitated, whether the drink should be exhibited hot or cold.

The ancient Greek physicians exhibited water in fever, not only cooled to the heat of the atmosphere, but cooled to the freezing point; and they gave such cold water, to the quantity of a quart or two, to be drunk at once. The purpose for which such quantities of very cold water were exhibited, will be taken notice of afterwards. At present the ordinary food and drink of the patient are only treated of.

Some modern practitioners conceive, that cold fluids, thrown into the stomach, would

render the blood thicker, and would make it produce obstruction. Cold undoubtedly increases the viscosity of all fluids; this is shewn by a cold fluid passing through a filter much slower than the same fluid when it is hot. The body is always kept nearly in the same degree of heat. Probably one of the uses of this equal heat is, that there shall be no alteration of the viscosity of the fluids, so as to affect the filtrations which are constantly taking place, and by which some of the most important functions are performed.

When cold water is thrown into the stomach, the power in the stomach itself of keeping its own temperature, in common with the other parts of the body, will prevent the heat of the blood in it from being rendered much less than the ordinary heat of the animal. The rapidity with which the blood passes through the vessels of the stomach, would hardly allow time for it to be affected much by the heat of water in the stomach. After a man has put his hand in water even as cold as the freez-

ing point, the author has found blood taken from a vein of the arm not cooled to less than ninety degrees. If the blood was rendered so thick as to be capable of obstructing the vessels, it would be the vessels of the stomach itself that would be obstructed; but no mischief arises to the stomach when frozen watery fluids are thrown into it. Although thousands of the inhabitants of London are every day in the practice of eating ice, we find no mischief arise from throwing it into the stomach, either in health or in fever.

When a vein is opened, and blood flows from it into a basin, the coagulable lymph separates from the water by which it was dissolved, and becomes solid; but the coagulable lymph becomes solid equally, whether the blood be kept in the heat of the human body, or be heated only to the heat of thawing water, which is less; or to the heat of an hundred and thirty degrees of Fahrenheit's thermometer, which is more than it can ever be exposed to in the human body.

There is therefore no reason to believe, that cold water thrown into the stomach, especially in such quantity as the patient chooses to drink, can make any alteration in the thickness of the blood, by its operation in the stomach.

The author, therefore, concludes, that as it is of no use to restrain the patient from drinking as much as he pleases, or to compel him to drink more than he chooses, so it is of no use to prevent him from drinking it of the degree of heat that he likes best.

The next thing to be inquired into is, the quality of the watery fluid that is used for drink in continued fevers.

Water is obtained without any artificial process, as it flows out of the bowels of the earth by springs; in which case it almost always contains some saline substances, most commonly *natron muriatum*, or *magnesia vitriolata*, or both; and likewise very often a vapour, which was called gas by

Van Helmont, who first discovered it; and since his time fixed air, and by many other names. When the water passes in a stream from the spring, exposed to the atmosphere, the gas evaporates, and the salts are decomposed; so that in a river, although it may be mixed with earthy matter, which disturbs its transparency, yet there is nothing chemically combined with it.

There is a mode of decomposition of salts, consisting of an acid and an alkali, called neutral, an acid and a metal called metallic salts, and an acid and an earth called earthy salts, which has been taken too little notice of by practitioners in medicine, although it is very often of great importance in the exhibition of medicines.

If a neutral, metallic, or earthy salt, be dissolved in barely as much water as will dissolve it, and exposed to the air, no change will take place; but if this saturated solution be diluted with a considerable quantity of spring, river, or rain water, on standing exposed to the air, the salts will be decomposed:

posed: the neutral salts will first have their alkali converted into magnesia, and afterwards the acid will be lost, and the magnesia fall to the bottom. In metallic salts, the metal falls to the bottom in a calx, that is combined with pure air, and that calx is sometimes combined with gas. In earthy salts the acid will also be lost, and the earth will fall to the bottom. An easy experiment shews this. Make a saturated solution of cuprum vitriolatum in water, and let it stand in a wine glass exposed to the air of the atmosphere; it will remain perfectly clear and transparent; but if we put a drop of this solution into a wine glass holding two ounces, full of water, the liquor will be at first perfectly transparent; but in less than a minute it will begin to grow opaque, and in less than an hour will fall to the bottom, in the form of a blue calx. This explains what happens in mineral waters; the neutral, metallic, and earthy salts contained in them, are decomposed when they are but in small proportion to the water, on being exposed to the air of the atmosphere. In like manner, if we dissolve a grain of tar-

tartarized antimony in an ounce of spring, river, or rain water, with a view of giving a quarter of an ounce, and of consequence a quarter of a grain of tartarized antimony, at the end of every six hours. The first quarter of an ounce may contain a quarter of a grain of tartarized antimony; the second quarter of an ounce less; the third quarter of an ounce still less, and the last quarter of an ounce contains almost none at all.

To return from this digression; a person accustomed to any stimulus, applied to the organs of the senses, feels an uneasiness if that stimulus be removed, such as a man feels when the light he has been accustomed to is removed; so pure water, applied to the palate, is insipid, and gives that disagreeable sensation which has been called mawkishness. Thus the inhabitants of London are fonder of water issuing out of the earth by springs, which contains magnesia vitriolata, and natron muriatum, and gas, than distilled water; and from being accustomed

accustomed to the former; feel distilled or pure water disagreeable to the taste.

It seldom happens that a solution of any saline substance, which is not disagreeable to the taste from the salt contained, can do any mischief to a patient affected with regular continued fever, and therefore whether he drinks pure water alone, or water combined with such salts, and such a quantity of gas as are commonly combined with it in springs, is of no consequence.

It has often happened that water has been impregnated with the essential oils of some of that class of plants, which in Linnaeus's system are called didynamia gymnospermia, such as sage, balm, &c. and exhibited for drink in fevers.

This practice has arisen from an hypothesis, that increasing the hot fit of fever by stimulants would tend to produce a crisis. Although this hypothesis was considered by Sydenham, in this country, as not true, and is given up by practitioners of knowledge in medicine, the practice of

giving these infusions has, notwithstanding, continued from mere habit. This practice seldom does mischief, but is of no manner of use.

Weak vinous fluids are in a state of fermentation; and as substances in a state of fermentation are apt to excite any other fermentation that the same substances are capable of, are perhaps useful to excite in the stomach the fermentations by which the food is converted into chyle, they are therefore so far perhaps better than pure water. Sydenham accordingly recommends small beer, a weak vinous fluid, formed from an infusion of malt, provided it be perfectly in the vinous state, as a drink proper to be employed in continued fever,

Solutions of farinaceous substances, after they are coagulated, such as barley water, have not only the advantage of making the superfluous water of the blood remain longer in the blood-vessels, so as to carry off more effectually the superfluous saline substances,
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and putrescent mucilage of the blood, but likewise afford nourishment of very easy digestion, and are therefore very useful as drink in all fevers in which such nourishment is required. They may be rendered more palatable by mixing a little acid from any vegetable, such as lemons or oranges, and if it should be more agreeable to the patient a little sugar, which also tends to give nourishment.

When a man is seized with fever, it often happens that before the moment of the fever taking place, he felt himself in perfect health. It may happen, therefore, that just before the fever came on, he may have eaten a considerable quantity of food, which of course would not be digested, converted into chyle, and pass into the blood-vessels; nor would it any how else be emptied out of the *primæ viæ*; and the powers of digestion being lessened, as well as the other powers of the body, the food would remain in the stomach undigested. When food remains in the stomach or intestines undigested, it either goes through the vi-

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nous and acetous fermentations, or putrefies, and in both cases occasions great disturbance in the system. It produces sometimes uneasiness about the stomach itself, and at first a sense of coldness generally all over the body; afterwards a sense of heat, or heat without any preceding coldness; a feel of fullness in the abdomen, flatulency, frequency of pulse, pain in the forehead, sometimes sickness, and sometimes cutaneous eruptions, or even inflammation about the head. All these derangements ought to be avoided in fever. The readiest mode of getting clear of these mischiefs is, to employ an emetic to evacuate such substances out of the stomach. If such undigested food should have got into the duodenum or jejunum, an emetic will evacuate these likewise, as is evident from its bringing up a quantity of bile, which never gets into the stomach in the healthy state of the body. Supposing that no food has been thrown into the stomach for many hours before the fever begins, so that all that has already been thrown in has digested, and the stomach and intestines have been cleared of it entirely, even
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in this case most practitioners have considered it as necessary to exhibit an emetic. Perhaps it may be, that something like the same crust that is formed on the tongue, may also be formed upon the surface of the stomach, and be evacuated by the emetic; or whether it be by some other effect of the emetic, the patient is relieved by it so much, as to have induced all practitioners to recommend it at the beginning of fever, or even five or six days after the fever has begun, supposing an emetic has not before been given.

It may be doubted whether the emetic produces relief in all cases, by evacuating something noxious out of the body, or whether the action of the emetic may not give relief to the patient in some other way. This is a question which will be agitated hereafter, when at the same time the quality of the emetic and the mode of exhibiting it will be treated of.

Among the powers of the body which are depressed by fever, the peristaltic motion
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of the intestines is one. The intestines, therefore, do not carry down the undigested part of the food, nor the bile, pancreatic juice, nor other substances secreted in them. Any of these substances remaining in the bowels produce a sense of fulness, weight, and uneasiness and restlessness in every part of the body, and augment the fever very considerably. It becomes necessary on this account to employ some laxative to keep up the peristaltic motion of the intestines, and produce an evacuation every twenty-four hours. At the beginning of a fever there may be undigested food in the intestines, while the patient is sufficiently strong to be able to bear a larger evacuation than afterwards. In this case it is not of much consequence what laxative is employed. But after the fever has gone on for some time, especially if the strength of the patient be reduced, the practitioner should never employ laxatives, which are uncertain in their operation, lest by too large an evacuation taking place, the patient should be very materially hurt.

Purgatives.

Purgatives are very far from having one quality in all of them ; some act, for example, in much less time than others. Such purgatives as neutral salts, or such salts as contain magnesia combined with an acid, increase the secretions from the intestines, and operate in an hour or two after their exhibition, and their effects are soon over. Others, as aloes and rhubarb, increase only the peristaltic motion of the intestines, and neither produce so copious an evacuation, nor are they so quick in producing their effects, not operating very often in less than ten or twelve hours.

Of these two species of purgatives, it may be proper to employ such as increase the secretions, and operate quickly for the first time, because the intestines will thus be quickly evacuated, and the substances contained in them not suffered to remain long enough to increase the fever or disorder it, provided the patient should have a sufficient degree of strength. If he should be very weak when attacked by the fever, the risk must not be run even at the beginning, when his strength
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is not at all exhausted by the fever, of exhibiting even one dose of such a purgative as neutral salts, &c. lest large evacuations should be produced by it, and the patient so reduced as never to have his strength recruited so as to be able to be supported during the disease.

If one dose of such a purgative as increases the secretions from the intestines, and produces quick evacuations, be exhibited at the beginning of the disease, it is improper to repeat it, because the want of appetite, and even loathing of food in the patient, prevent him from throwing down such substances as we want to evacuate very quickly, or wash off afterwards. It is much better to employ such purgatives as increase the peristaltic motion only; for this purpose cassia, manna, and other such laxatives, together with senna, rhubarb, and sulphur, are to be employed. Although they are longer in their operation, and perhaps even give a little more pain to the patient, their effects are much more limited, so that they run little risk of weakening by too copious an evacuation; they also clear the intestines

more certainly of what is wanted to be got rid of.

It may be said, that we might fix on some laxative which is preferable, and ought always to be employed, this way being much more simple and determinate. It is to be observed, however, in the first place, that the constitutions of different patients are often different from each other, and substances applied to different men have different effects; so that if one laxative happens not to produce sufficient effect in its ordinary course, it may be supplied by another which can. Moreover, in one situation one laxative may be procured, when another of the same kind cannot. But the principal ground on which it is necessary to enumerate various laxatives is, the advantage that arises of mixing several of them together. When one laxative is employed alone, and in a sufficient dose, it is apt to produce sickness, pain in the bowels, and is uncertain in the degree of its operation. When several laxatives are mixed together, they are much less apt to produce sickness

ness or pain, and are much more certain in their operation.

This observation is applicable to a variety of different classes of medicine; but it would be much too great a deviation to enter into any discussion of this subject here.

Certain purgatives not only affect the stomach and intestines singly, but also produce considerable effects on the whole system. They render the pulse frequent, for instance, such are jalap, scammony, and many others; it would be certainly improper to employ any of these to act as laxatives in fever.

When the patient has gone through the first week of the fever, his strength begins to fail, in so far as that any great evacuation might bring him so low, that he could not afterwards be easily supported through the remainder of the disease. It is therefore a question, whether it is proper, after the first week, to give him a laxative by the mouth.

It happens unfortunately, that medicines do not operate precisely in the same manner and in the same degree, every time they are exhibited, although in the same dose, and under circumstances perfectly similar, as far as can be judged. The same purgative, or mixture of purgatives, exhibited to the same person in health at the distance of a week, when such person appears to be exactly in the same state in all circumstances, will operate often very differently, hardly ever exactly in the same manner. At the first exhibition it shall purge four or five times, with or without much pain ; at the second perhaps twice, and with the reverse proportion of pain ; or it shall purge the first time only twice, and the second time three or four times. The action, therefore, of such purgatives is very far from being constantly the same. It is to be remembered, that it is stated that the doses are given at least with the interval of a week ; if two equal doses of the same purgative be exhibited to the same person with a day's interval, the first dose generally purges much more than the second.

A laxative medicine thrown into the stomach after the first week of the disease, although given in the same dose which before produced one evacuation in twenty-four hours, may now therefore produce five or six, and may by this means diminish the powers of the system too much, and is therefore to be exhibited with great caution.

If there were no other mode of evacuating feculent matter which has been accumulated, the mischief arising from it is such, that a laxative must be employed, although certainly with caution.

There is, however, another mode of applying purgative or laxative remedies, so as to affect the intestines, encrease their peristaltic motion, and occasion their contents to be evacuated, and even increase the secretions from them.

If purgative medicines are injected into the rectum only, or with such force as to throw them up also into the colon, they will operate so as to occasion any' feculent
matter

matter then to be evacuated. This mode of applying purgatives or laxatives, differs only from the former in the degree of their operation, and is said to be by glyster.

The question to be here agitated is, whether it may be better or safer to employ purgatives or laxatives in the latter part of fever, to keep the intestinal canal clear of feculent matter in this way, or by the mouth.

As purgatives thrown into the stomach, and passing from thence into the intestinal canal, are immediately applied to the excretory ducts of all the glands of the intestines, they of course stimulate all these glands; if they act by stimulating the glands; and by thus producing a flow of fluids in every part, wash the whole canal clean from beginning to end, and are so far preferable.

Since such purgatives likewise as tend to increase the peristaltic motion of the intestines, when thrown into the stomach, are applied to the whole internal coat, as they pass along they increase the peristaltic motion through the

whole, and so empty the intestines completely.

Purgatives, therefore, thrown into the stomach, clear the whole intestinal canal better than glysters.

In the beginning of fevers the food that was not digested remains in the upper part of the intestines, and therefore at the beginning of regular continued fevers, on this ground, it is better to give purgatives by the mouth.

When purgatives are thrown into the rectum and colon, as they perhaps never rise above the colon, it is a question whether their influence, as acting on the rectum or colon, extends to the ileon, or higher; whether therefore they can clear the upper parts of the intestines.

For the present purpose this need not be argued; for after a fever has continued a week, and is regular, if purgative medicines by the mouth have been given to clear the upper part in that week, little food, and
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that only of the easiest digestion, being employed afterwards, all that is required is to keep the lower parts clear of the recrementitious parts of that food, and of the fluids secreted in the intestines. Glysters therefore, after the first week of the disease, seem sufficient to evacuate any noxious matter that may be in the intestines.

It is true that it may often happen, and actually does often happen, that during the first week of a continued fever, the practitioner who has attended to the patient has not thought of the state of the *primæ viæ*, but left the patient without one evacuation from the intestines for several days; and that this costiveness continues, or a purging arises from the feculent matter having putrefied, or otherwise become stimulating. In this case purgatives or laxatives must be thrown into the stomach; but such cases will be treated of more fully in the dissertations on irregular fever.

Glysters have this difference in their action from purgatives, that they are not near

so apt to produce a number of very loose evacuations, and so weaken the patient. As therefore they are sufficient to keep the *primæ viæ* clear after the first week, they are preferable for the reasons above given.

Nearly the same substances used for laxatives given by the mouth may be used for glysters.

The vehicle should be some mucilaginous watery fluid, as solution of farinaceous matter in water. Solution of flower of oats, which we call water gruel, may be used. Decoction of mallows, &c. are also proper. Such mucilaginous substances are preferable to pure water, as they prevent the stimulus of the purgative from acting so immediately on the intestine, and so making the glyster be evacuated directly, without bringing the feculent matter along with it.

It would be too great a digression here to enter into the explanation of this subject; it is sufficient to say, that the effect is actually found to be so. For the same reason oil
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has also commonly been added to glysters. Oil has also the effect of smoothing the inside of the intestines, and allowing hard feculent matters to pass easily over them.

The purgatives to be used in glysters in regular continued fevers are manna, cassia, &c. ol. ricini, senna, &c. which do not stimulate the system. It is also much better to mix them together, as in the elect. sen. comp. for the same reason as purgatives given by the mouth are better mixed.

In continued fevers, where glysters are merely used to keep the primæ viæ clear, neutral salts are not so applicable, because they are apt to induce a watery secretion from the intestine, which is not wanted, but is hurtful.

If after the first week of a continued fever the patient should have had no evacuation from the intestines for twenty-four hours, a glyster should be used about six or seven in the evening, that the feculent matters may be evacuated before the time of

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sleep.

sleep. This should be repeated every evening, when there has been no evacuation in the former part of the day.

If there should be two or three looser evacuations in the course of the day, it is also useful to employ glysters of mucilaginous fluids ; but this will also be more properly considered among the irregularities which take place in the disease.

The sleep in fevers is prevented from being either so long or so sound as in health ; the patient is of consequence very much weakened. It has been shewn also, that sleep occasions the cessation of all irregularities in the system, and therefore that it has a tendency to carry off fever, which is undoubtedly a very considerable irregularity. As the ordinary hours of sleep among mankind are generally the time of the greatest force of the hot fit in continued fevers, if it could be procured, especially before the time of the crisis or relaxation, which is about four in the morning, by its tendency to remove all disturbances in the system, it
would

would assist the hot fit in carrying off the disease. It would therefore be of great consequence if sleep could be procured in fever, as the force of the living power would be recruited, crisis would be more apt to be produced, and all disturbances in the system would be got rid of.

After exercise, whether it be labour or for amusement, man is disposed to sleep. But in a fever the patient can neither labour nor employ exercise for his amusement : he ought undoubtedly to be kept as much at rest as possible both in his body and mind ; this method of procuring sleep, therefore, is quite out of the question in continued fever.

There are some things that induce mankind to sleep when the powers of the system are not at all exhausted. Perfect quietness of mind ; freedom from pain and uneasiness in the body ; no passion rousing to exertion, nor bodily pain drawing strongly his attention, and every thing that gives one constant and pleasant sensation lull the
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person to sleep. As an instance of the last, among some nations, gently pinching the skin. Gentle motion in the air from the waving of fans, the gentle and uniform noise of the flowing of water, or the wind rustling through trees, also lull a man to sleep. Such attention to uniform and agreeable objects can hardly be employed with efficacy, to release the mind from that anxiety which renders the patient restless in fever. Something of this kind the author once saw successful; the dropping of water, running slowly through a filter, into a basin of fluid placed below.

Opium is a medicine which has been known to produce sleep and give rest to those who are fatigued, probably as long as the effect of any medicine has been known. There is some medicine said to have been given by Helen to Telemachus to produce this effect. This indeed is the only medicine mentioned by Homer as having any effect when exhibited internally. Opium was certainly well known in the earliest ages in Greece. In many cases, as when a man is exhausted by labour or weakened
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by evacuations, it procures a quiet, easy, and refreshing sleep, if exhibited in the quantity of from half a grain to a grain. In regular continued fever, if exhibited in this quantity it often produces sleep, but that sleep is disturbed; the patient is often distracted with various incoherent and frequently disagreeable dreams; and he often wakes in the morning with a conviction that he has not slept at all. Instead of a relaxation of the fever taking place in the morning, the headach is greater, he has more thirst, the appetite is less: sleep, therefore, so procured is so far different from that rest which gives time for the powers of the body to be recruited, that they are more exhausted during it than they would have been if the patient had not slept at all. It is true, there are some cases in continued fevers in which such a restlessness from the opium is not produced, but a quiet, easy, refreshing sleep follows its exhibition; these are, when there are irregularities in the disease. Such cases will be described in a future dissertation.

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A great many substances have been mixed with opium to render the sleep procured by it more quiet and refreshing ; such as spices, acid of benzoen, preparations of antimony, antispasmodics, and many others ; but no mixture has as yet been found out, which renders such doses as have been described capable of producing easy and refreshing sleep in regular continued fevers.

About five and twenty years ago there arose a practice in St. Thomas's Hospital of exhibiting opium in a much less quantity, to wit, in the quantity of a quarter of a grain for a dose, and repeating it at the end of every six or eight hours. When given in such doses it produces no immediate effect, but by degrees the patient falls into a stupor which gradually increases ; and although this stupor does not end in a complete sleep, yet it grows in a day or two into that kind of stupor that we find, when the delirium from the fever, with apparent fulness of the vessels of the brain, begins to diminish. It is true, indeed, that this dose of opium is obtained by adding a few drops
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of laudanum to that mixture which is called mithridate, but the author has often employed the opium in his private practice, with ten grains of castor, with equal or rather better effect.

Lately many practitioners have exhibited opium three or four times in the twenty-four hours in fevers, having borrowed their practice probably from that which has been pursued in St. Thomas's Hospital, the practice of the Hospital being open to the inspection of many pupils. These practitioners have not learned however, that it is the smallness of the dose that produces beneficial effects ; if the dose be increased so far as half a grain, the same restlessness, the same disturbed sleep, dreams, &c. as have been noticed, are brought on.

Mithridate, Theriaca Andromachi, &c. contain an immense mixture of mucilaginous medicines, spices and astringents, with a small quantity of opium : this vast farrago renders their effects totally unintelligible, and they have therefore been thrown aside ; but
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many practitioners have given them up with great reluctance, especially old practitioners. It may be said, indeed, that a man who has been in the habit of exhibiting any medicine in a disease does not like to be disturbed in that habit, but it is not improbable that they have been led to continue the use of these, from the good effects arising from the exhibition of the small doses of opium they contain.

Whether such small doses of opium can with propriety be employed during the first week of the fever, has not been determined. The author has not ventured upon employing it, nor does he know that any other person has employed it during the first week of the disease.

It is a question whether it might be proper to employ it in the second week, notwithstanding there is delirium of either kind in a considerable degree. This question, however, seems to be determined by practice; in either case of delirium it would appear that it is proper, that it considerably
abates

abates the delirium, and especially that it takes off that violent increase of delirium of the first species which arises in the evening.

Opium is not the only medicine which has been employed with a view of procuring sleep. There are certain medicines which have been called antispasmodic, which have also been employed for the same purpose by many practitioners. An antispasmodic medicine is a medicine which takes off any contraction arising without an apparent cause, or continuing after the cause of the contraction has been removed: this definition has been by no means adhered to. The medicines which have been more particularly employed to procure sleep in a regular continued fever, and which are ranked among antispasmodic medicines, are æther and oleum vini, and sometimes musk, castor, and camphor. The author has very seldom seen the three last procure sleep in this disease; but a mixture of alcohol, æther and oleum vini, such as Hoffman strongly recommends under the name of liquor anodynus, and which is probably the same as the spiritus ætheris

ætheris vitriolici compositus of the London Dispensatory, the author has seen procure sleep in many instances in regular continued fever. The great drawback from depending on its powers is the uncertainty of its operation. Sometimes, given to the quantity of a dram in the evening, it procures a perfectly sound and quiet sleep; or if the like dose be repeated every six hours, sleep takes place at the ordinary hours of rest, quiet, sound, and refreshing. On the other hand it is to be observed, that its effects in producing sleep are perfectly uncertain, and that the patient is often just as restless after it has been exhibited as if he had taken no medicine at all: it happens even much more frequently that it does not produce any effect. Moreover, it cannot be distinguished, by any sensible appearance in the patient, in what cases it will produce an effect, or where it will not produce any effect at all. No bad effects, however, arise from employing it, as far as the author has been able to discern; there is, therefore, no reason for not employing it when the patient is restless and without sleep,

sleep, however capricious it may be in having this effect during the disease.

Where a regular continued fever is left to pursue its ordinary course, the efforts that take place in the fever, and the want of sufficient nourishment and sleep, frequently weaken the patient towards the end of the disease to such a degree as to be dangerous, and even in some cases fatal. It often happens likewise, that this weakness is greatly increased by evacuations which have been unnecessarily made by injudicious practitioners. Weakness is also induced by evacuations which arise from irregularity of the fever, and which consequently will become the subject of a future dissertation. Weakness also often takes place for want of food, first from the necessity of withholding food from the patient in sufficient quantity; if the patient should take in a larger quantity of food, from its not being digested and converted into blood, it must either be evacuated without change, or converted into water, and carried off by an effort which would still fur-

ther diminish the force of the system. Weakness may be also produced by not exhibiting that quantity of food that may be digested, either from want of skill in the practitioner, or the carelessness of the attendant. What the quantity and quality of food are which ought to be given has already been described. Weakness may also be induced by practitioners employing medicines that occasion considerable efforts in the system, without diminishing the disease, although no improper evacuations have been made.

If no unnecessary evacuations have been made, if care has been taken to give food in such quantity and quality as the patient can digest during the progress of the disease, if the patient has not been exhausted by the application of improper medicines, it rarely happens that such a degree of weakness arises in a regular continued fever as to endanger the life of the patient.

If such a degree of weakness should, take place, at the end of a regular continued

tinued fever, as to endanger the life of the patient, the force of the body may in some degree be kept up, by employing medicines which will induce the powers of the system to act with all their force, until the fever shall so far diminish as to allow of the stomach digesting food of better nourishment, or the powers of the body to be recruited by sound and refreshing sleep. The practice of exciting the body to act with all its powers, until the fever is so far gone off, depends upon the following principle.

Let a patient ill of a regular continued fever be ever so weak at the time of the crisis, or at the time when the disease has gradually worn itself out; as soon as the fever is entirely terminated, provided the patient is allowed to be perfectly at rest, and if proper nourishment is exhibited to him, to wit, such as he can digest, the powers of the body begin instantly to be on the increase; therefore the patient will be gradually restored to his health again.

Although there may be considerable power in the system, yet there may be a want of exertion of that power ; so that the patient may sink and die from weakness, though there are still in the body powers, which if they had been exerted might have kept the patient alive. By employing medicines to make the body exert these powers until the fever is gone off, the patient will be preserved, and afterwards gradually recover his strength.

If this was not the case, all stimulants employed in fever would evidently be extremely hurtful, for every extraordinary exertion tends to weaken the system, and to exhaust the powers that it brings into action ; and therefore if all the powers in the body were already in action, the increasing that action would weaken the system much more, and render the weakness more fatal, instead of preventing the patient from being destroyed by it. The stimulant employed must rouse the dormant powers, in order to have good effects.

The medicines which have been employed for making those powers exert themselves that otherwise would not, are now to be treated of: the ordinary means of recruiting the strength in health by nourishment and sleep having already been attended to, as far as they have an effect in regular continued fevers. With what variation food and sleep are to be managed in a regular tertian has already been sufficiently argued, and what attention is to be paid to them in irregular continued remitting and intermitting fevers, will make part of future dissertations.

The author means here to take notice of the several different modes that practitioners have employed to excite the action of the living power, in regular continued fever, and give his opinion with regard to them, whatever has been the opinion of other practitioners of whatever estimation.

First then, many practitioners have endeavoured to excite the dormant powers of the body, for it is these only, as the author

has just observed, that can be excited to advantage, by producing inflammation of the skin by the application of various stimulants.

If an inflammation is produced in the exterior parts of the body, so as to occasion any alteration in the system generally, if it be phlegmonous inflammation, the pulse becomes hard, full, strong and frequent, and there arises an universal sense of heat; but the powers of digestion are impaired; the patient loses his appetite, so that he cannot swallow so large a quantity of food; the ordinary quantity of food which he makes use of in health, and of the ordinary quality, produces sickness and vomiting, or at least great uneasiness and disturbance throughout the whole body; the faculties of the mind cannot be equally exerted, and especially the imagination and judgment; the muscular powers are also diminished, a man cannot go through the same labour, the sleep is likewise prevented. Phlegmonous inflammation therefore prevents the body from being recruited

recruited by food and sleep, and the muscular powers of the body and the powers of the mind are considerably depressed. If an inflammation of the skin be produced in a man in health, otherwise an erysipelatous inflammation, so as to occasion affection of the general system, the pulse becomes much more frequent, often to one hundred and twenty strokes in a minute, or more; it also becomes smaller and weaker, the strength is generally depressed, and all the powers of the body and mind are in consequence less powerfully exerted. In a person otherwise in health, therefore, neither the inflammation of the substance of the exterior parts of the body, nor an inflammation of the skin, increase the powers of the system; on the contrary, they diminish the powers of the whole. If it were wished that a man should lift a greater weight, in order to enable him to make such greater exertion, no one would apply a blister to his back, or make a deep and painful wound in any part of his body. It is true, that we spur a horse to make him run swifter, but the greater exertion in this

case is from his endeavour to escape from pain.

Although then exciting any kind of inflammation by no means increases the force of the body otherwise in health, yet in health the actions of applications to any part of the body may have a very different effect from what the same applications would have, if they were made to the body when diseased. Whether exciting inflammation has or has not the same effect in a regular continued fever which it has in health, can only be known by making these applications to the body of a person affected with regular continued fever. As far as the author's experience goes, when any stimulus has been employed so as to produce inflammation, when a patient has become weak towards the end of a regular continued fever, the only difference that has occurred has been, that phlegmonous inflammation has not produced hardness, fulness, and strength of the pulse; but both phlegmonous inflammation and inflammation of the skin have occasioned greater frequency of the pulse,
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have rendered it weaker and smaller, and, as in health, have prevented sleep, and the patient taking the same quantity of nourishment, and have depressed and deranged the whole system.

The author therefore concludes, that stimulants applied to the skin so far as to excite inflammation, by producing such inflammation, do not keep up the strength or make any dormant power act, but that on the contrary they weaken the patient; and that therefore exciting inflammation of the skin is not to be employed to keep up the strength, when weakness takes place towards the end of a regular continued fever.

When substances are applied to the skin so as to excite inflammation, such substances may be absorbed, carried into the general course of the circulation, and be applied to all the irritable parts of the body, and may so act upon some or all of these as to bring the dormant powers of the body into action, and so may keep up the strength towards the end of a regular continued fever.

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It may be worth while, therefore, to enquire into the effects, which the substances employed commonly to excite inflammation of the exterior parts produce, when they are absorbed, get into the general course of circulation, and are applied to the various irritable parts.

The stimulating matter of cantharides has been very commonly employed to excite inflammation of the skin, and to keep up the strength towards the end of continued fevers.

That this matter is often absorbed there can be no question; it very frequently, in consequence of being absorbed, produces inflammation of the neck of the bladder, which we call stranguary; when it produces this effect, the pain and constant sense of uneasiness irritate and exhaust the patient at all times. Every practitioner who has employed cantharides to excite inflammation, and attended to their effects, must have observed them often, when absorbed, produce subfultus tendinum, convulsions and hysteric

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ric fits, all of which are certainly very far from keeping up the strength in continued fevers.

In like manner, if we examine any other stimulant which has been employed to excite inflammation externally, in order to keep up the strength towards the end of a continued fever, we shall find that when they are absorbed they produce effects upon the irritable parts of the body, which are not at all conducive to support the strength towards the end of continued fevers.

The author, therefore, is obliged to reject the excitement of inflammation of the exterior parts of the body, as a means of supporting the strength towards the end of continued fever. He does not say, however, that it may not be proper to excite external inflammation for other purposes in regular continued fevers; but this will be a matter of future consideration.

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The next means of exciting the action of the dormant powers of the body, so as to make them act in such manner as to support the strength at the end of a continued fever, when the patient is weak, is the application of substances which act upon the stomach itself, and by that means to excite the other parts of the system to exert themselves powerfully. The first kind of these to be enumerated is that class of plants, called by Linnæus *Tetradynamia*, together with the several species of *Allium*, and likewise *Ammonia*.

These stimulants, when thrown into the stomach, act upon it immediately, long before there is time for them to get into the blood-vessels; their effects go off also in an hour or two, and while they produce any effect, it is principally that of making the pulse more frequent, without increasing its strength or fulness. Such stimulants have therefore been properly rejected from the remedies fit to be employed, to make the dormant strength of the system be exerted towards the end of continued fevers.

The

The gums, as they were formerly called, are the resinous substances which exude from vegetables, forming either a pure resin, or a mixture of mucilaginous and resinous matter. Neither these, nor preparations of mercury, seem to act upon the system generally, when they are immediately thrown into the stomach, but require some days before they produce any effect, being probably absorbed, and applied to the several irritable parts in the system. Of these, mercury is much too apt to produce evacuations to be trusted, lest such evacuations should weaken the patient much more, and even to that degree as to destroy him; and the resinous substances pointed out have not been so much made use of, as that we can determine the propriety of their exhibition. The author indeed has seen them employed, but if he remembers right, without any great effect.

The spices, such as cinnamon, nutmegs, cloves, pepper and cardamoms, have been very often and very much employed to keep up the strength in continued fever. They
are

are not nearly so much in use at present, as they were about fifty years ago. When they have any sensible effect, they render the pulse much more frequent, smaller and weaker ; hence they are certainly improper. It is true, indeed, that by adding a quantity of acid to them the frequency of the pulse is reduced, and is in some way in a certain degree prevented ; they are, however, in general very improper remedies for this purpose, except when there is a great deal of flatulency in the *primæ viæ*, which depresses the strength of the patient ; he is therefore relieved when this flatulency is carried off, which effect these spices are powerful in producing.

Wine seems to be the only remedy that is of use to excite the dormant strength of the system, when weakness takes place towards the end of continued fevers. It tends to increase the force of the system, without increasing the frequency of the action of the heart, and on this ground it may be more safely employed than any other stimulant. It has also a narcotic power.

Wine

Wine should be employed in moderate quantity ; when exhibited in large quantity it produces intoxication, the effects of which every man who has drunk it in such quantity very easily perceives. The stomach, after the intoxication is gone off, is disordered, spasmodic contractions take place in it, and it is not capable of digesting food, which last effect would render the patient weaker from want of receiving sufficient nourishment ; it should be used, therefore, sparingly, and not in the least to intoxicate.

It ought only to be employed, when the weakness has just become considerable, in moderate quantity ; for if we exhibit it in greater quantity than is sufficient to make such part of the dormant strength of the system, as is required, to be exerted, it will exhaust that dormant strength, and not leave a sufficient quantity to support the patient during the remaining part of the disease.

When

When wine is first employed by persons not accustomed to use it, where it becomes necessary to employ it from weakness, four ounces is a sufficient quantity of wine of the strength of Port wine. The strength of wines can hardly be transmitted to posterity by any permanent mark, for the strength does not depend on the alcohol they contain, but likewise on the quantity of a vapour, which was called by Van Helmont gas silvestre, probably different from that vapour which he called gas simply, and which has since been called fixed air and carbonic acid, although the author thinks these improper names; that, however, is foreign to the purpose of this dissertation.

The author has also to observe, that in patients who have been accustomed to drink wine even in large quantities, three half pints are quite sufficient to be exhibited in twenty-four hours.

If wine is made use of it should be well fermented; it is very rare that weak wines are well fermented, it is better then that
 strong

that strong wines should be used ; sweet wines are perhaps preferable from the nourishment contained in them, but they are seldom well fermented, except they be very old : if not well fermented, they are aced-scent and flatulent.

It has been a question whether it is better to employ the wine by itself, or diluted with the farinaceous or mucilaginous vegetable substances we employ for nourishment to the patient. It appears to the author, that they should be diluted with farinaceous or mucilaginous substances mixed with sugar, as these take off the immediate stimulus with which wine, when strong and pure, is apt to act upon the stomach. On the same ground the author would perhaps condemn all distilled spirits, excepting in some sudden cases of extreme weakness, such as happens from too copious an evacuation from any excretory organ in the body.

The author has now shown the means of treating a regular continued fever, supposing it is left to pursue its ordinary course.

The next thing to be enquired into is, whether means have been found out to shorten the fever by producing a crisis, or otherwise, so that the patient shall be restored to health.

This enquiry will lead the author to consider whether bleeding, either from any vessel in the body indiscriminately, or from some particular vessel in a particular part of the body, has the power of carrying off the fever.

Whether purging, or making any other evacuation to any degree, has a power of carrying off a regular continued fever.

Whether exciting inflammation in the skin, or in any other part, has any power of carrying off a regular continued fever.

Whether Peruvian bark, or any other remedy acting on the same principle, has any power of carrying off a regular continued fever.

Whether stimulants, such as spices, have
any

any power of carrying off a regular continued fever.

Whether antispasmodic remedies have any power of carrying off a regular continued fever.

Whether there be any medicine which carries off a regular continued fever, that has no apparent action on the body when in health, or affected with other diseases.

Whether preparations of antimony, or ipecacuanha, or those other medicines which have been enumerated in the dissertation on a regular tertian, as bringing on a crisis similar to that which takes place in fever itself, or render it more perfect, have any power of carrying off regular continued fevers.

If symptoms of putrefaction of the fluids should arise, whether any remedy, and what remedies may be employed to restore them to their healthy state.

If hæmorrhage should arise in consequence
of

of putrefaction, whether any remedy, and what remedies may be employed to stop such hæmorrhage.

Lastly, if any of these remedies have a power of carrying off or diminishing a regular continued fever, in what manner they are to be employed for this purpose, and what circumstances may make it improper to exhibit them.

These enquiries will form the second part of this dissertation, which is in great forwardness.

END OF THE FIRST PART.

A
THIRD DISSERTATION
ON
F E V E R.

PART II.

CONTAINING AN
INQUIRY INTO THE EFFECTS
OF THE

E R R A T A.

- Page 10, line 17, *et passim*, for erysepelatus, read erysipelatus.
13, line 5, for arise, read arises.
38, line 13, for the, read an.
61, line 22, after six o'clock, insert in the evening.
92, line 9, for coruse, read course.
111, line 14, for attempting, read attempted.
120, line 4, for 1797, read 1757.
202, line 19, for solid, read solids.
208, line 3, for will, read shall.
212, line 2, for since, read since.
227, line 1, for then, read there.

Son

circa generalia nimium occupari; quandoque
laria accedere, resque ipsas attentius et diligentius inspicere, magis vera et utilis
feret comprehensio.—IBID.

BY GEORGE FORDYCE, M.D. F.R.S.

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1799.

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Lastly, if any of these remedies have a power of carrying off or diminishing a regular continued fever, in what manner they are to be used.

END OF THE FIRST PART.

A
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PART II.

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OF THE
REMEDIES,

WHICH HAVE BEEN EMPLOYED WITH A VIEW TO CARRY OFF
A
REGULAR CONTINUED FEVER,
WITHOUT LEAVING IT TO PURSUE ITS ORDINARY
COURSE.

Medicina igitur adhuc taliter comparata est, ut fuerit magis ostenta, quam elaborata; etiam magis elaborata quam amplificata.

BACON AUG. SC. LIB. II. CAP. I.

Solent autem homines naturam tanquam ex præalta turri et e longo despicere, et circa generalia nimium occupari; quando si descendere placuerit et ad particularia accedere, resque ipsas attentius et diligentius inspicere, magis vera et utilis fieret comprehensio.—IBID.

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1799.

DR. FORDYCE'S LECTURES COMMENCE
THE FIRST MONDAY IN OCTOBER
AND FEBRUARY.

THIRD DISSERTATION, &c.

PART SECOND.

HAVING, in the first part of this dissertation, pointed out the history of a regular continued fever, the accidents that take place in it, and the manner of avoiding these accidents, if it should be left to pursue its ordinary course; excepting one accident, to wit, putrefaction, which arises but seldom; the author in the next place is to take into consideration the remedies by which the fever may be carried off, so as to leave the patient in health in a shorter time, or to conduct him through with less danger, than if the fever had been left to pursue its ordinary course.

Since, as has been already observed, the essence of fever, or the state in which the system in fever differs from the healthy state, is altogether unknown, the effects of medicines in removing that state can only be known by observation or experiment ; there being no remedy that has any property, either chemical or mechanical, or any operation, when given to a man in health, that can point out any ground for employing it to carry off this disease.

The author now, therefore, comes to shew what remedies have been employed by practitioners to carry off regular continued fevers, whether they have been employed in consequence of some hypothesis, or have been found out by mere accident.

The first remedy to be considered is opening a vein in the arm, or indiscriminately in any other part of the body, and letting a quantity of blood flow out.

Authors and practitioners have confounded fever, such as the author has defined,

finer it, with many other diseases, particularly with all such diseases in which the pulse is frequent to a certain degree.

Many diseases, in which the pulse is frequent to a certain degree, differ from one another in almost every other respect. The pulse is frequent to upwards of an hundred strokes in a minute in a pleurisy; it is often frequent to above an hundred strokes in a minute in gangrene and mortification; but pleurisy, and gangrene, and mortification, are very different diseases, and require treatments totally different from each other. In pleurisy, taking away large quantities of blood is one of the most powerful remedies for carrying off the disease; in gangrene and mortification, taking away large quantities of blood would be the most effectual means of destroying the patient. In gangrene and mortification, the best mode of putting a stop to the disease, is to exhibit the bark of the cinchona, in large quantities, with wine and spices; in the pleurisy, exhibiting large quantities of the bark of cinchona with wine and spices would be

the surest way of increasing the pleurisy, and rendering it fatal.

Certainly, therefore, diseases in which the pulse is frequent may differ from each other in all things, excepting mere frequency of the pulse, which Dr. Boerhaave makes a specific mark of fever. It is to be observed, that he had not at the time he gave this definition ever seen a fever, having studied theology, and not medicine.

It has already been shewn that the pulse in fever is by no means always frequent, and that therefore frequency of the pulse can by no means be considered as a pathognomonic symptom of fever.

If all diseases, in which the pulse is frequent, be confounded together, and called fever, it certainly cannot be said that taking away blood never cures the disease; but if the disease, which the author has endeavoured to define as fever, be only meant, the taking blood from a large vein, in any part of the body indiscriminately, never diminished,

nished, shortened, nor carried off a fever in any case he has seen, nor has he found any upon record in which it had this effect.

It is true that an accident, such as general inflammation, may happen in an irregular fever, which may destroy the patient, which accident may be counteracted and prevented from doing mischief by taking blood from the arm, or any other part indiscriminately, as will be described when such irregularity is treated of. The accident being removed, the fever may afterwards continue its course, may terminate by a crisis, or wear itself out, just in the same manner as if no such accident had taken place.

The author having affirmed that taking away blood from the arm, or from any large vein, neither increases nor diminishes a fever, nor alters its course, as far as he has seen, he next comes to consider what might be expected from taking away a quantity of blood indiscriminately from any blood-vessel during a fever.

A quantity of blood flowing out of the body, whether it be taken on purpose, or by any accident, occasions weakness. If the blood continues to flow, the weakness will encrease so as to render the body incapable of performing any function or action whatever, and in consequence to kill. If it does not continue to flow, it weakens a man, and the weakness continues until the blood is reproduced by the digestion of food of proper nourishment, or perhaps by the conversion of expressed oil, or other substances deposited in the body, into new blood. This weakness, with the accidents that arise from it, are the only effects of the loss of blood, which are perceivable.

As fever takes place equally in a strong and a weak man, it is also equally violent, as far as regards the fever itself, in a weak man as in a strong man, and it is apter, or at least as apt to run out to a great length in a weak man, as in a strong man.

It is not, therefore, *a priori*, at all probable, that weakening a man should diminish or shorten a fever.

It

It comes then to be enquired into, why taking away blood indiscriminately from any large vein has been so often practised in fevers, even by practitioners of the first rank in medicine ?

The author can only refer this practice to the impatience with which mankind bear any evil, and that superstition which predominates in them. If any violent disease takes place, men immediately recur to some violent remedy. Their recurring through impatience to some very violent remedy is no proof, that such remedy is useful to give them relief from the malady. If a man who has gone upon a journey should return, and without previous notice find his house burnt down, his whole family and property destroyed, and all his friends ruined, he would be apt to stamp upon the ground, beat his breast and tear his hair ; but stamping upon the ground would not rebuild his house, nor would beating his breast restore his family and property, nor tearing his hair retrieve his friends. It is mere impatience that makes

him have recourse to these violences, so mere impatience makes mankind have recourse to violent remedies in diseases, although no experience has shewn that they are of any use in the disease for which they have been employed. To this argument the author will have occasion to recur, when he comes to treat of irregular intermittents in a future dissertation.

So in like manner it is often from superstition that such violent remedies, and especially blood-letting, have been employed.

Mankind are exceedingly apt to believe, that refraining from some gratification is agreeable to the Almighty, or the gods their imaginations have created ; even if they enjoy that gratification, without any injury to their own health or constitution, or without injury to their fellow creatures, or any animal whatever, or without hurt to their moral character.

Some pretended teachers of religion have even gone so far as to refuse to their disciples,

ples, dying of so distressing a disease as pulmonary consumption, the gratification of enjoying the cheerful warmth of the sunshine.

Under this, or some very similar idea, men have thought that their gods would be content with one part of the body to save the whole. Hence we see among many rude nations, that a finger or toe is cut off, or a tooth or two knocked out, in order that the rest of the body may be left safe.

Blood, by its intense red colour, has attracted the attention of mankind. It has also attracted their attention because the loss of it, as has already been said, in a certain quantity, is fatal; the losing, therefore, a quantity of blood, has become the object of their superstition. Losing blood has been looked upon as the greatest oblation that could be made in the most solemn ceremonies; as the mark of the greatest bond of secrecy and steadiness, men have signed contracts with their blood. Taking away, therefore, a quantity of blood has
been

been thought a sacrifice the most powerful for carrying off a disease, and for carrying off fever as one of the most violent and fatal of diseases.

The author does not mean to say that every practitioner, who bleeds constantly at the beginning of a regular continued fever, has this idea in his mind. The greatest number of practitioners follow the practice of those who went before them, without examining from whence that practice has arisen, or upon what ground it is founded.

From this view of the subject it may, perhaps appear why blood-letting has come into practice in the beginning of all regular continued fevers.

Practitioners also have not compared cases of fevers in which it has been practised, and of fevers treated otherwise in the same manner in which it has not been practised.

The author has said, that taking away a quantity of blood from any large vein indiscriminately,

discriminately, in any part of the body, neither increaseth, diminishes, nor shortens a regular continued fever. The next enquiry is, whether any mischief may arise in a regular continued fever from taking away a quantity of blood.

The author has already shewn that a patient afflicted with regular continued fever cannot digest his ordinary quantity of food; therefore the fluids which are constantly wasting cannot be recruited, and that the system must be weakened.

That in a regular continued fever there are constant exertions which likewise debilitate.

That the rest which takes place in sleep is necessary to restore the living power, but sleep being prevented in fever it is not recruited.

That in consequence of all these causes of weakness, the patient is actually so debilitated as to be destroyed in many instances.

stances. The further debility arising from emptying the vessels by taking away a quantity of blood, is often such as to destroy the patient in the remaining part of the disease. Patients in consequence have very often been cut off, when blood has been taken indiscriminately from any large vein at the beginning of the disease, as the author has seen in a great many cases. In the first part of the author's practice, the Boerhaavian doctrine prevailed; this induced practitioners to take blood from the patient in all cases of fever, so that the author has had occasion frequently to see the effects of this practice.

The author having said that the essence of the disease not being at all known, it cannot be said, *a priori*, whether any particular remedy will be of use in shortening or entirely carrying off fever.

Taking away blood from the vessels of the head has, in some cases, immediately carried off fever; it has also tended to diminish delirium accompanied with fulness
of

of the vessels of the head, even when it does not shorten the disease.

The first of these effects will be considered in a dissertation on the irregularities of fever, and the second in a future part of this dissertation.

Many practitioners have supposed that fever arises from some peculiar kind of matter that has got into the body; that fever is an effort produced in the body to induce some operation by which such matter might be destroyed. Sydenham judiciously supposes, that a fermentation takes place which alters the qualities of the matter, or converts it into another species of matter which has not the property of producing or keeping up this disease.

If it were really true that any particular species of matter produced and kept up a fever, it would follow that until such matter was destroyed by a fermentation, or some other process that might take place in the body, or was evacuated, the fever would
continue.

continue. In that case, it would become a question whether some other means than that which takes place in the body of itself, might be employed to take this matter out of the body, or destroy it, so that it might no longer keep up the disease.

Some practitioners have supposed that this might be done by evacuation.

If a blood-vessel is opened, the whole circulating fluids are equally evacuated, every one, good or bad, noxious or innoxious, those that are commonly in the body, and those that are there only by accident; no particular matter would be taken out more than another, and therefore it is not to be supposed that the matter occasioning a fever would be removed by making this evacuation.

If the substances evacuated out of the body by the various excretions be examined slightly, they appear to be more different than when they are examined more minutely, but still upon minute examination they differ very much.

It

It might happen that some secretory organ is disposed to throw some particular noxious matter out of the system, and that therefore, by increasing some secretion, (since an encrease of any secretion, to a certain degree, occasions the secreted matter to be thrown out of the body) might make the matter producing and keeping up fever be evacuated, so that the fever should cease. But it may also happen on the other hand, as has already been taken notice of, that a fever may arise without any noxious matter being applied to any part of the body, or generated in the body; and in this case there being no noxious matter to evacuate, neither the operation of purgatives, or any other evacuant would carry off the matter, and so remove the disease.

It has also been shewn that noxious matter does sometimes produce fever when applied to the body, and that after the fever is produced, it is really contained in the body, as in the case of fever arising from the application of variolous matter; but then it has been shewn, that in such cases the noxious
matter

matter produces the disease at once, and what is contained in the system after the fever had taken place, has no effect upon the disease; it neither increases it, nor does its absence diminish it, and the fever often goes off when there is the largest quantity of noxious matter in the body. - In such cases it would not surely be conceived, if we could evacuate such matter, that the disease would be carried off; in such cases, therefore purgatives would be of no use.

Hitherto the argument has been pursued *a priori*; but neither the essence of fever, nor the operations of the human body, are sufficiently known, as the author has before observed, to determine the efficacy of any medicine to carry off fever; experience must therefore be had recourse to, to determine whether purgatives or any other medicine producing evacuation from any gland may be employed to carry off the disease.

If the matter be referred to the experience of the most judicious authors, all those who have conceived fever to depend upon
matter

matter of a peculiar kind contained in the system, have agreed that it must be concocted before it can be evacuated ; that is, that it must undergo some process before it is prepared for evacuation ; otherwise that evacuation, by purging, or increased secretion from any of the glands, will have no effect in carrying off the disease. They are agreed at least that evacuation before concoction must only be made at the beginning of the disease to be efficacious ; after the disease has continued a day or two, they have no more expectation that evacuating the matter will carry off the disease. The author, therefore, would be warranted by authority to say, that evacuation by purging, or any other increased secretion from glands, would have no power of carrying off fever, excepting the evacuant should be employed in the first twenty-four hours ; or at the end of the disease, after the matter is concocted, or has undergone such an alteration as to render it fit for evacuation.

It is further to be observed, that when any matter is applied to the body, so

as to produce fever, not immediately, but at the interval of several days, such as the matter of the small pox, or the measles, or putrid or infectious vapour; if purgatives are employed during the interval between the application of such matter, and the taking place of the first paroxysm of fever, the fever has never been prevented from taking place in any case which the author has seen; or in any case which has been recorded with almost any evidence. This is equally to be observed in those cases in which the application of the cause has produced some immediate appearance of the first stage of fever without producing a perfect paroxysm; when these appearances have continued until a complete paroxysm has taken place.

In those cases where the application of the matter to the body, which occasioned the fever, produced no appearance of the disease on its application, but the patient felt himself in perfect health until the complete attack of the fever came on, neither purgatives nor any other medicine increasing secretion, have prevented the disease.

If

If the evacuation by purging or increased secretion from any of the glands, does not carry off the matter from the body before it has produced the disease, there seems to be little reason to hope that such evacuation will carry off the matter occasioning the fever, and the fever itself after it has actually taken place.

The author has already observed, that feculent matters remaining in the intestines, which they are apt to do when a fever takes place, tend to increase the disease. Though their removal prevents the mischief they would produce, yet, as far as the author has been enabled to judge from the attention he has paid to such cases, their evacuation has in no case done more than merely obviate the mischief which would have taken place in consequence of their retention. Such evacuation has never, in any degree, removed the fever, or prevented it from pursuing its ordinary course.

Those practitioners who have believed that fever depends upon some noxious mat-

ter contained in the body ; that that noxious matter is concocted ; that is, goes through some operation by which it is prepared for evacuation, have also supposed that when a crisis took place, the matter was evacuated after it is concocted, and that so the fever was carried off. They have thought that if it was not completely evacuated, it is necessary to employ purgatives to evacuate what might remain of the matter in the body, and re-produce the disease. They have also thought that when no marked crisis took place in the disease, but it gradually subsided, that it subsided more slowly on account of the noxious matter not being all at once evacuated, and therefore have employed purgatives to make it be evacuated more speedily, so that the disease should sooner subside.

The author, from his own practice, is obliged to be of a contrary opinion, since he has seen relapses much more frequently take place when purgatives have been employed after a marked crisis, or after the disease has gradually subsided, than when purgatives have not been employed.

Upon

Upon the whole, then, the author believes it to be perfectly necessary at all times, during the progress of a regular continued fever, to keep the intestinal canal free of feculent matter; yet that making further evacuation by purging or increasing the secretion from any of the glands, so as to occasion evacuation, is of no use in carrying off the fever, but rather tends to prevent the fever from being carried off, and, if it is carried off, to produce relapses.

Moreover the author has already shewn, that it required the whole force of the system to support the patient through the ordinary course of a regular continued fever. He has also shewn that the force of the system is reduced by evacuation; he must therefore conclude, that simple evacuation by purging, excepting in as far as it is necessary to keep the *primæ viæ* clear of feculent matter, is detrimental instead of being useful; and that simple evacuation from any of the glands, as tending also to weaken, is detrimental instead of being useful.

It does not appear with any degree of certainty that antimony, a medicine which has been employed to carry off fever within this century or two, was at all known to the Greek philosophers, physicians, or artists.

There was a substance which they named stibium, which was employed to give a blackness to the eyes, but the effects which were produced from it either among the Greeks and Romans, or among the modern inhabitants of Asia, shew that this substance was more probably a kind of lead ore than an ore of antimony.

Antimony, or as it is more commonly called crude antimony, is the ore of a metal which exists in many parts of the earth. It is a compound of sulphur and a metal, in which the sulphur bears a much greater proportion to the metal than can be combined with it chemically. More properly, it is a compound of sulphur and the metal, diffused through a superfluous quantity of sulphur, so that part of the sulphur retains
some

some of its properties, which it has when not combined with the metal. The sulphur so covers the metal or is so combined with it, as to prevent it from producing its medicinal effects. This ore of the metal is solid in the heat of the atmosphere. It requires a little less than that degree of heat which renders substances luminous to melt it, somewhere probably between five and six hundred degrees of Fahrenheit's thermometer. Its melting point has not been exactly ascertained in as far as the author knows. It is of a dark blue colour, and is generally found in a kind of crystallization, sometimes in complete crystals, which are prisms terminated by pyramids at one end, and at the other generally attached to each other; otherwise is a mass without form. More commonly these crystals are united together so as to form a striated mass, especially when they are unmixed with any other substance.

The metal has lately been found also combined with some substance, so as to

form the same kind of crystals or striated mass, only of a dark red colour, shining, however, with metallic lustre. It has been conjectured rather than confirmed by experiment, that these crystals or this striated ore contain arsenic, besides sulphur and the metal of antimony. This conjecture is rendered probable, because this red ore of antimony has been almost always found with regulus of arsenic; that is, the metal of arsenic pure; and therefore experiments made to verify the existence of arsenic in this red ore, should be made in such parts of it as are perfectly clear from the particles of the metal of the arsenic in which it is found.

The metal has also been found but very rarely, certainly however sometimes uncombined with any other substance, but so rarely hitherto as not to be employed for any medicinal purpose.

Upon the whole, all the antimony which has been employed in medicine has been
procured

procured from that ore of antimony, consisting of antimony and sulphur.

This ore, when dug from the mine, is laid upon an inclined plane, formed from a mixture of clay and sand burnt in the fire. The inclined plane is heated red hot; the ore of the antimony being laid upon it melts, and runs off from the other substances with which it is mixed, and is received into a large and deep earthen vessel, in which, when it has stood to cool, it concretes into a solid mass.

If this solid mass concretes so as when broken to exhibit long striated shining spiculæ, it is a pure compound of antimony and sulphur, and fit to be employed for medicinal purposes.

A vast number of chemical processes have been employed to give antimony medicinal effects; more than two or three thousand. Of the product of all these there are only three preparations at present much in use.

One is made by boiling the antimonial ore or crude antimony in a solution of pure or prepared kali in water. The decoction, after it has been strained, is diluted with a considerable quantity of water, at least ten times its weight. The diluted solution is placed in a shallow vessel, the surface exposed to the air, until a powder falls to the bottom of the vessel, which, taken out and dried, is called kermes mineral.

The second process is performed by mixing the ore of antimony or crude antimony, finely powdered, with an equal weight of the shavings of the horn of any animal. This mixture is to be put into an iron pot, which is to be heated red hot, and the mixture is to be stirred, the pot being kept red hot, until it ceases to smoke. The mixture is afterwards to be allowed to stand until it cools. It is then to be put into a crucible, which is to be covered with another crucible, whose mouth is to be turned down into that crucible which contains the materials. The crucibles with the materials are exposed to a white heat for two hours; part of the mat-
ter

ter remains of a white colour in the under crucible, which is to be used ; part sublimes into the upper crucible, which is to be thrown away.

The third preparation is made by combining the metal of antimony with tartar, an acid produced in the fermentation of various wines, which is found adhering to the sides of the vessels in which the wine has stood for a year or more after the active fermentation has ceased.

When two substances, which unite with one another only in one proportion, are combined together chemically, and the compound purified, the substance is undoubtedly the same in all its properties. It happens, nevertheless, with respect to the chemical combination of two substances which unite with each other in one proportion only, that when they are combined together by different processes, there are often different imperfections in the combination or some want of purity in the compound. This, though not sensible to any chemical test,

test, makes a very considerable difference in their actions as medicines. In the present instance of the compound of tartar and the metal of antimony, or, perhaps, if strict adherence was to be had to chemical accuracy, we should say compound of tartar and calx of antimony, this difference is conspicuous. Of the several methods of forming this compound, the following is the best for medicinal purposes : Take an equal weight of the ore of antimony separated from extraneous substances by fusion, as has been above described, and of kali nitratum. Powder them together, and throw the mixture into a crucible, heated so as to be just luminous, by very small portions, about twenty grains at a time, until a deflagration takes place ; wait till the deflagration is over ; throw in a little more of the mixture ; wait again till the deflagration is over. Proceed in this manner until the whole is deflagrated. Cover the crucible, and expose it to an heat just sufficient to melt the whole mass. Pour the melted mass into an iron vessel of a conical form, the point of the cone being downwards ; the whole

whole will be found, when it is cold and solid, divided into two substances, one of a reddish brown colour and heavier, which has fallen to the bottom; the other, of a grey colour, which is found at the top, and is specifically lighter. The heavier part, which is found at the bottom, is a compound of sulphur and the metallic part of the antimony. A portion of the sulphur which was united with the antimony in its ore, more than was necessary to combine with the metal of the antimony, is converted into vitriolic acid by uniting with the air of the nitrous acid. This vitriolic acid is found in the upper greyish mass, combined with the kali of the kali nitratum, and forms kali vitriolatum.

The antimonium sulphuratum, found at the bottom, is to be powdered and mixed with one third more than its weight of purified tartar, and boiled in six times its weight of water for a quarter of an hour; the solution is to be filtrated and the water evaporated, and the compound of the tartar and the metal of the antimony crystallized.

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This salt for chemical purposes may be purified, by dissolving it again in water and re-crystallizing it ; but it is a question whether it would not lose some portion of its medical powers by this purification.

The metal of the antimony may be separated from the sulphur with which it is found combined in its ore, by mixing the ore with five times its weight of kali preparatum ; that is, with kali combined with gas, which gas has been called also fixed air and carbonic acid. The mixture of the kali preparatum and ore of the antimony is to be melted together by a heat just sufficient to render them perfectly fluid. The crucible being taken from the fire is to be left till it is quite cold ; on breaking it, the metal of the antimony will be found at the bottom, and the compound of kali and sulphur at the top.

This is not the most economical mode of obtaining the metal of antimony ; but provided we take the ore separated from the other substances with which it is found
mixed

mixed in the mine, as has above been described, the metal by this process is obtained the purest for medicinal purposes.

If the metal thus obtained is powdered finely, and boiled with pure tartar in water, a compound of the tartar and antimony will be obtained, which, if purified by re-crystallization, will be exactly the same with that obtained by the process above described, in all its chemical properties.

Another mode of obtaining this compound is—Take the ore of antimony purified, as has been already described, powder it, and put the powder into a flat vessel; heat it till it begins to smoke; keep up the heat, but take care not to render it so great as to melt the mass, until it no longer smokes in any heat not sufficient to melt it. The remaining mass, which is the metal of antimony calcined (probably combined with pure air) if exposed to a greater degree of heat, will melt into a glass. If this glass be powdered, and boiled with pure tartar in water, a compound of antimony and tartar will also be procured; this purified by repeated

peated solutions in water and crystallization will, in all its chemical properties, be the same as when the salt is procured by the two processes already described, but if not crystallized a second time, will not agree exactly in its medicinal effects.

The metal of antimony may be combined with muriatic acid, by several processes. One of these, for instance, is. Mix the ore of antimony with that compound of muriatic acid and mercury which has been called corrosive sublimate. Perform a distillation, or rather a sublimation, and expose the matter sublimed to the air of the atmosphere, until it has attracted water enough to render it fluid ; pour this solution of antimonium muriatum in water, or any other made by this or any other process in which the water is saturated with the antimonium muriatum, into eight or ten times its weight of distilled water. A calx of antimony will fall down in a white powder, which has been called powder of algarath ; this being boiled with pure tartar in water will combine with it, and form antimonium tartarifatum, which,

which, if purified by re-crystallization, will be the same to all chemical and medical purposes as the antimonium tartarifatum produced by the three foregoing processes, but not exactly in its medical effects unless purified by recrystallization.

Although the antimonium tartarifatum obtained by any of these processes, when purified by re-dissolution in water and re-crystallization, may perhaps be the same for medicinal as well as chemical purposes, which however has not been proved by experiment, yet when it has only simply been formed by these four different processes, without re-dissolution in water and re-crystallization, there is a difference in its operations as a medicine.

When the London College of Physicians reviewed their pharmacopeia for its reformation and republication in the year 1786, it became a question which of the four processes they should adopt.

Whenever any question of a chemical or pharmaceutical kind occurred, it

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was referred to a committee consisting of some members of the College and the Company of Apothecaries, and the processes were actually performed in the laboratory of the Company of Apothecaries, that so the best mode of performing the operation might be verified by experiment.

A question having arisen with regard to tartarised antimony, it was prepared by all these processes.

The tartarised antimony produced by these processes was given to the Physicians of St. Bartholomew's and St. Thomas's Hospitals. In St. Thomas's Hospital they were given to more than an hundred patients, so as to give each of them to one and the same patient in small doses.

The tartarised antimony prepared with the crocus metallorum and tartar was found to be capable of being exhibited in a larger dose than any of the others without producing sickness, and to act more powerfully as a sudorific, and therefore was preferred, whether

ther properly or not, will be argued afterwards.

At the time the science of medicine was revived with the other sciences first in Italy, there does not seem to have been any medicine recommended to put an end to fever immediately by Galen or Celsus, or any of the Greek or Roman writers upon the subject, excepting cold water drunk in a large quantities at once. It was not supposed that a fever might otherwise be cured immediately so as to prevent any future appearance of the disease, either by preventing the returns of the paroxysms, or carrying off the disease instantaneously, or by producing an immediate crisis. The doctrine then was to attend to the disease while it pursued its ordinary course, only taking care of the accidents which might happen during that course, that is, taking fever according to that idea of it which the author has been endeavouring to lay down.

There arose in Europe some time afterwards a number of alchemists who made

many processes with a view to convert metals into gold. Having formed many substances by processes which did not make gold, but which produced many things which they were not able to turn to any profit, they tried to apply them to the cure of diseases. All such chemists must be considered as empiricks, and the greater part of the substances which they produced were in fact of no use. Antimony, however, gained a reputation for carrying off some diseases without their going through their ordinary course if otherwise left to themselves; it is probable it was employed for this purpose in fever as soon as the time of Van Helmont.

These chemists did not study medicine, nor did they distinguish diseases, but only aimed at making some profit of the result of their processes. They called every disease fever in which there was great sense of heat in the patient, and greater frequency of the pulse than in health, so that they not only employed preparations of antimony in fever, but in internal inflammations and various other diseases.

Practitioners,

Practitioners, who were educated in the regular practice of medicine, studied principally the writings of the ancient Greek and Roman Physicians. These used for the most part vegetable substances for remedies in diseases ; the modern practitioners, therefore, reprobated all the substances which were the result of chemical operations ; they considered them only as the boast of ignorant empiricks. This opinion went so far, that even so late as the time of Boerhaave, mercury was rejected by regular practitioners in the venereal disease.

Some practitioners, as there always will be men who balance between two different doctrines, employed indeed preparations of antimony, but such as had little or no effect ; such as antimony calcined, by deflagrating it with three times its weight of nitre, and various others equally inefficacious. They of course did not find any advantage arise from preparations of antimony ; they therefore reprobated the use of all antimonial medicines in fever. Hence it happened that they were not much employed before the time of the late Dr. James with efficacy

in Great Britain : he was a Physician of regular education, having studied at the University of Cambridge, but was considered in some degree as an empiric in consequence of employing some preparation of antimony, which he kept a secret.

The preparation he made use of consisted principally of antimony calcined, by mixing it with shavings of harts-horn, and exposing the whole to a great degree of heat. Upon analysing it, which was done long before his death, it was found to consist of a calx of antimony, mixed with bone ashes. It is extremely probable, that he mixed along with it a proportion of tartarised antimony ; the author knows that he purchased considerable quantities of tartarised antimony, two pounds at a time, from an eminent druggist. This might easily escape the scrutiny of a chemical analysis, since the quantity contained in one dose did not certainly exceed a quarter of a grain. From the very easy decomposition of tartarised antimony, when dissolved in a large proportion of water, so small a quantity might not be observed,

Dr.

Dr. Cullen was the first eminent teacher of medicine who recommended the use of preparations of antimony to carry off fevers directly. As most of the principal practitioners of the present day, in this island of Great Britain, have been pupils of Dr. Cullen, its use has lately very much prevailed. If this had not been the case, it would have been a question whether it would not have sunk into oblivion, like any other empiric remedy whose preparation was kept secret.

Dr. Cullen conceived, that the effect of preparations of antimony arose from their producing sickness. Tartarised antimony is much more certain of producing sickness, than any other preparation that was known to him; it was therefore preferred by him, and of course that preparation of antimony which produced sickness in the smallest dose he considered as best.

The author is of a different opinion; to wit, that it is not the sickness produced by the preparations of antimony, that has the

effect of carrying off fever immediately, but some other operation of the medicine.

First, because there are many other remedies which produce sickness to as great a degree as any preparation of antimony; yet these have no power whatever of making fever terminate sooner than it would if it was left to pursue its own course. The root of the squill, for instance, often produces sickness to a much more severe degree than any preparation of antimony, yet it has never been alleged, that it has the power of carrying off fever sooner than it would go off, supposing that it was allowed to pursue its ordinary progress. Moreover, the author has frequently exhibited the root of the squill as an emetic, and likewise in such doses as to produce nausea without vomiting; also in such doses as just not to produce nausea, without ever producing any thing similar to the appearances which take place in a crisis of fever, or without ever once occasioning a fever to terminate sooner than it would have done if left to pursue its own course. In so far, therefore, the author must conclude, that the sickness occasioned

caused by the exhibition of a preparation of antimony is not the cause of its carrying off fever.

Secondly, the stomachs of different men, though they are otherwise in the same situation, are affected differently by the same quantity of any particular medicine: the stomach of different persons, or of the same person at a different time, being able to bear a larger dose without its producing sickness or vomiting.

Almost every medicine given in a certain dose will produce sickness and vomiting; even opium, if given in a certain dose, that is, to the quantity of two or three grains, will sometimes produce sickness and vomiting, and sometimes purging.

When a medicine is given in such a dose as to produce vomiting, it often loses its peculiar effect. The bark of the cinchona, when given in such a dose as to produce vomiting, either from the disposition of the stomach of the patient not to bear so large a quantity as the stomachs of men will generally bear, or from its being exhibited in a
larger

larger dose than common, will often fail in putting a stop to the progress of an intermittent fever. It may be said indeed, first, that the peruvian bark, by producing sickness and vomiting, will be thrown out of the stomach before it has time to be absorbed and carried into the blood-vessels. But the author has shewn in his Dissertation on a regular tertian, that it does not put a stop to the progress of an intermittent fever by being carried into the intestines and absorbed, but by the impression it makes on the stomach and intestines. In the second place, it may be said that the bark of the cinchona, by producing vomiting, is prevented from remaining a sufficient time in the stomach to make its impression there; but the author has also shewn in the same Dissertation, that the bark of the cinchona exhibited half an hour before the beginning of a paroxysm of a tertian intermittent, often makes sufficient impression to prevent the paroxysm from taking place. It is often more than half an hour after the exhibition of a dose of the bark of the cinchona before it occasions vomiting; but when it does occasion vomit-

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ing, it often does not prevent the return of the disease,

Plumbi acetat.

In like manner, cerussa acetata given in a small dose does not produce either vomiting or purging, but on the contrary a diminution of the peristaltic motion of the intestines, and not uncommonly a paralytic affection of them, and likewise of the extremities; yet when it has been by accident taken in a considerable dose, to the quantity of a dram or two, as the author has seen in several cases happen, it has produced both vomiting and purging, but no paralytic affection of the intestines, or any other part of the body, has ensued.

The author therefore conceives, that when any remedy produces vomiting, it very often loses by this effect its other operations on the system, and that preparations of antimony, in like manner, if they produce vomiting, or even sickness, though no vomiting should ensue, lose their effect in carrying off fever.

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The author conceives, that every medicine given in too great a dose acts as a simple stimulant on the part to which it is applied, and loses its peculiar effects both on that part, and on the system generally. Thus a moderate quantity of wine makes the stomach digest the food more readily than it otherwise would have done, but a large quantity of wine prevents digestion from taking place at all. A moderate quantity of spice gives a feel of warmth over the whole system, a large quantity of the same spice produces pain in the stomach and coldness over the whole system, and frequently sickness and vomiting. It would be too great a digression to enter fully on the maximum of the doses of medicine ; if the author should live to finish these Dissertations, it is a subject that he means to pursue.

In the third place, the author has observed, when tartarised antimony has been exhibited in fevers, that when the patient's stomach could not bear a quarter of a grain of it prepared as has been said, without producing sickness, it has happened rarely
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that it has produced any thing like a crisis, or in any way diminished or carried off the disease. On the contrary, when the stomach would bear more than a quarter of a grain of tartarised antimony, prepared in the same way, and by the very same individual process, without producing any nausea, it has very often produced critical symptoms, or a complete crisis, so as to carry off the disease. For these reasons, the author differs in opinion from Dr. Cullen, and believes it is not the sickness that has the power of producing a crisis, or any appearance of crisis in a regular continued fever.

It appears then, first, that several medicines, producing as great a degree of sickness as preparations of antimony, have no power whatever of carrying off fever, by producing crisis, or appearances similar to crisis, or in any other way.

Secondly, that producing sickness prevents medicines generally from operating in their own appropriate manner.

Thirdly,

Thirdly, that preparations of antimony, when they produce sickness in small doses, are not so efficacious in carrying off fever, as when it requires a larger dose of them to produce nausea; and also that they are more efficacious when no nausea is produced; and therefore, upon the whole, that it is not the nausea produced by preparations of antimony, that renders them efficacious in producing symptoms similar to those that take place in the crisis of a fever, and so carry off the disease. On the contrary, that any preparation which can be made to act with certainty in a larger dose, without producing nausea, is preferable for carrying off fever. Further, that tartarised antimony, prepared by boiling crocus metallorum with tartar in water, and not purified by a repeated solution and crystallization, is the best manner of preparing the compound of tartar and antimony for this purpose.

The next question is, whether tartarised antimony prepared, as has been described, or regulus of antimony mechanically mixed with sulphur, as in that preparation which has been called kermes mineral or the calx of antimony,

antimony, mixed with calx phosphorata, which formed at least a principal part of Dr. James's powder, and is the pulvis antimonialis of the last edition of the London Pharmacopeia, are the preferable preparations of antimony for immediately producing symptoms similar to those that take place in the crisis of fevers.

The regulus of antimony in the kermes mineral, the calx of antimony in the pulvis antimonialis, are neither of them soluble in water. It has been held by many practitioners, that substances not soluble in water, must be combined with some menstruum in the stomach with which they form compounds soluble in water to be efficacious. If this be the case, these preparations of antimony, to wit, kermes mineral and pulvis antimonialis, will be subject to an uncertainty in their operation, by their meeting with or not meeting with a menstruum with which they may combine so as to form a compound soluble in water.

The first thing then to be enquired into is, whether it be true, that if any solid substance,

stance, insoluble in water, be thrown into the stomach, it will act upon the stomach and intestines, or system generally, without finding a menstruum with which it will combine so as to form a compound soluble in water.

It is well known, that sulphur thrown into the stomach in fine powder, as it is when precipitated from an alkali by means of an acid, or in fine crystals, as when it has been recently sublimed, will act as a purgative.

In either of these cases, if the sulphur be perfectly pure and unmixed with any extraneous matter whatever, it is not soluble in water in the smallest degree. It is true, that if sulphur be thrown into water, and left in the water with the surface of the water exposed to the atmosphere for some length of time, the sulphur will combine either with the air of the atmosphere or of the water, and form vitriolic acid, which is soluble in water. Sulphur recently precipitated from an alkali by means of an acid, or recently sublimed, has not acquir-

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ed any air, it acts however equally as a purgative. Moreover, vitriolic acid rarely acts as a purgative in any dose given uncombined with any other substance, whereas sulphur rarely fails of acting as a purgative.

It is therefore to be considered, whether sulphur meets with any substance in the stomach with which it will combine, so as to form a compound soluble in water.

In the first place, it meets with water in the stomach with which, it has been already said, it will not combine, nor will it be altered, excepting by long digestion, in the heat of the human body. If it should alter by combining with the pure air of the water, the acid thus formed rarely acts as a purgative; nor does inflammable air, the other element of the water, act as a purgative. It is therefore extremely improbable that it should act as a purgative, by decomposing the watery fluid that it meets with in the stomach.

The water found in the stomach is im-
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pregnated with animal mucilages, such as the solid matter of the mucus; but water, impregnated with animal mucilages, is not decomposed more readily by sulphur being applied to it, nor does it more readily combine with sulphur in consequence of its being already combined with such animal mucilage. The gastric juice, as it is called, in counter-distinction to other fluids found in the stomach, has been thought by some to be a powerful menstruum, and to unite with the food, so as to form chyle or some compound preparatory to the formation of chyle. This solvent power of the gastric juice the author has argued in his Treatise on Digestion, the result of which argument appears to be, that it has no such solvent power; on the contrary, it appears that its sole power is to coagulate certain animal and vegetable substances, so that they may be retained in the stomach until they go through that part of the process of digestion which is necessary in the stomach. No experiments have been made to shew whether or not this gastric juice will combine with sulphur, so as to form with it a compound soluble in water. It is extremely improbable

improbable that it does, since water, combined with other mucilaginous matters, does not dissolve sulphur more readily than pure water. Gastric juice renders certain substances insoluble in water, that are otherwise capable of being combined with it; it is therefore improbable, that gastric juice should combine with sulphur so as to form a compound with it soluble in water.

In the juices of the stomach, there is sea salt, that is, ^{sulphuric} natron muriatum; ammonia muriata, and ammonia phosphorata, and sometimes, perhaps, calx muriata, as there are in all the other juices of the body, but none of these salts combine with sulphur so as to form a compound soluble in water.

Other substances are found in the stomach sometimes, but not always; but sulphur almost always proves purgative, and therefore does not act on the stomach and intestines, in consequence of meeting with a substance in the stomach which is accidentally found there.

Sulphur, therefore, does not act as a purgative in consequence of any thing it meets in the stomach with which it forms a compound soluble in water.

Sulphur, when it gets into the duodenum, meets with bile which might combine with it, and form a compound soluble in water. The like might happen with pancreatic juice, with which it often meets in the duodenum. From the author's experiments, which it would be too great a digression to relate here, sulphur is neither capable of combining with bile nor pancreatic juice, and therefore sulphur does not act by combining with bile or pancreatic juice so as to form a compound soluble in water.

The same observations may be made with regard to the other fluids it meets with in the intestinal canal ; it is at least extremely probable, that it does not combine with any of them so as to form a fluid capable of being combined with water.

Sulphur

Sulphur is capable of being combined with that vapour which Vanhelmont first took notice of, and called gas, but which has since been called fixed air, and by many other names. This vapour is found sometimes in the intestinal canal. It is also capable of being combined with inflammable air. Neither of these vapours is found generally in the intestines, whereas sulphur acts almost always as a purgative.

We must therefore conclude that sulphur acts upon the stomach and intestines in a solid form. It is also capable of acting on them independently of any mechanical effect; a solid is therefore capable of acting on the stomach and intestines medically.

Regulus of antimony, and the calx of antimony made by mixing antimony with shavings of hart's-horn, burning them together, and exposing them to a great degree of heat, may act upon the stomach without being combined with any substance, so that the compound is soluble in water, and

therefore may act independently of any menstruum they may meet with in the stomach.

It has been often affirmed in medicine, that whatever was shewn to be possible, was also true. This is a proposition totally repugnant to all the laws of evidence; it does not follow, therefore, that although one solid in powder may act upon the stomach and intestines, every solid does. The next question then that comes to be discussed is, whether the fine powder of the regulus of antimony in kermes mineral, and the calx in the pulvis antimonialis, do act in a solid form without being combined with some substance with which they form a compound soluble in water.

In the healthy state of the body, the fine powder of the regulus of antimony in kermes mineral, and the calx of antimony in the pulvis antimonialis, being thrown into the stomach, will frequently act as an emetic.

In the healthy state of the body, there is no acid in the stomach not combined with

an alkali, therefore neither of those preparations of antimony can act in consequence of being dissolved by an acid in the stomach, unless they should decompose the neutral salts. Whether they can decompose the neutral salts, to wit, sea salt, common sal-ammoniac, or phosphoric ammoniac, as they are applied in the stomach, or whether they are soluble in the neutral salts themselves, is not known, and therefore the argument must be taken on another ground.

If tartarised antimony, prepared as has been described, be exhibited to a man in health, it hardly ever happens that a third part of a grain can be taken without producing sickness and vomiting, or purging. It very rarely produces any nausea, if taken in the quantity of a fifth part of a grain, by an adult. On the other hand, the pulvis antimonialis, or kermes mineral, will sometimes produce sickness and vomiting, taken in the quantity of three grains; on the other hand, they may be taken very often to the quantity of eight or ten grains, without producing any sensible effect. The

author has seen them often employed to the quantity of twelve or fifteen grains, without having any apparent effect at all.

Moreover, kermes mineral, and the pulvis antimonialis, the author has seen, in several instances, exhibited at the interval of six hours, for four and twenty hours, or forty-eight hours; without producing any sensible effect, and at last, all at once, they have brought on a severe vomiting and purging, so as to weaken the patient very much.

It must, therefore, be concluded, that either they are not active in a solid form, unless combined with some menstruum that will form with them a compound soluble in water, or otherwise that acting in a solid form, they are very uncertain in their operation. In either case, tartarised antimony is a preferable preparation to kermes mineral, or the pulvis antimonialis, or Dr. James's powder, which partakes of all the uncertainty of the pulvis antimonialis.

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The author does not by any means say that tartarised antimony, prepared as has been described, is the best possible preparation of antimony. On the contrary, he thinks that if a preparation was to be found out, of which the stomach would bear a much larger dose without sickness, and act with the same certainty, it would be preferable to tartarised antimony, prepared as has been described.

Another circumstance must be remarked. If tartarised antimony be dissolved in a large proportion of water, it, like all other metallic compounds with acids which are soluble in water, will be decomposed, if the solution stands with a surface exposed to the vapours which constitute the atmosphere. It will be less apt to be decomposed, if it be dissolved in recently distilled water, than in river, spring, or rain water. It will be still less apt to be decomposed if combined with wine, and especially a sweet and strong wine; it is, therefore, much better to keep it dissolved in wine. The solution is convenient when the wine contains a quarter
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of a grain of tartarised antimony, in half a dram by measure of the wine, as in the *vinum antimonii tartarifati* of the London Dispensatory. Of this solution, half a drachm by measure may be exhibited, or any greater or less quantity, mixed at the time of exhibition with an ounce of any watery vehicle, before it has time to decompose.

The other preparations of antimony, excepting those which have been enumerated, which are hitherto known, are so uncertain in their operations, as to make them totally unfit to be employed in fever.

It is an undoubted fact however, that other preparations of antimony than the three enumerated, have been exhibited to a patient ill of a fever, and have occasioned appearances similar to those which take place in the crises, which happen during the progress of regular continued fevers left to pursue their ordinary course. Such crisis has terminated the fever in the manner in which it is terminated by an ordinary crisis, so that the patient
has

has been freed from the fever in a few hours, it has not afterwards recurred ; but they act so uncertainly, that it is not worth while employing them.

Preparations of antimony, when exhibited to a man in perfect health in such a dose as just not to produce sickness, occasion, after two or three hours, a breathing sweat, and softness of the skin, not unfrequently a lateritious sediment in the urine, open the body, and produce afterwards an universal tranquillity over the whole system. They occasion therefore appearances similar, as much as can be, to those which take place in the crisis of fever.

It is attested by many authors, that on the exhibition of Dr. James's powder, the pulvis antimonialis, kermes mineral, and tartarised antimony, in two or three hours afterwards, or from that to five or six hours, the symptom which ordinarily arise in the crisis of fever have taken place, and that the fever has been carried off in less than
twenty-

twenty-four hours, so that the patient has perfectly recovered.

The author has seen each of these preparations of antimony exhibited in a fever during the ordinary progress of the disease, in the first week of a fever as well as in the second week of the disease. He has seen in less than five hours after the exhibition of the medicine, the symptoms which take place in the ordinary crisis of a continued fever arise, and the fever has ceased in less than twelve hours.

This effect of these medicines the author has seen, in many cases, where there was no appearance that a crisis would have taken place in the fever, supposing that it had been left to pursue its ordinary course.

A crisis generally takes place, in a regular continued fever, in the night time; that is, from four to six, or eight o'clock in the morning; the author has seen it produced at other times of the day.

When

When these preparations of antimony have been exhibited, the author has seen fevers much more frequently carried off by crisis, than in proportion to the number of crises which happen in fevers left to pursue their ordinary course. He has seen these things happen in many hundred cases of fever; it may therefore be concluded, that these preparations of antimony, being exhibited in a fever, often produce symptoms similar to those which arise in the ordinary crisis of fever, or, in other words, a crisis similar to the ordinary crisis in fever, and carry off the disease.

The next question which occurs is, whether there is any other medicine which produces the same effects either more certainly, less certainly, or equally with the preparations of antimony which have been enumerated? It is matter of consideration whether this question should be first discussed, or whether it would be better to enter into the argument in what manner the preparations of antimony, hitherto described, should be employed,

employed, so as to have the best chance of carrying off the disease.

There are many reasons that might be urged for taking the one or the other argument into discussion first; but it is not worth while taking up time in discussing this; it is therefore the author's determination, upon the whole view of the subject, to pursue the best method of employing preparations of antimony to produce crisis in fever, though he is not sure that he is right, as he may be obliged, in many instances, to take notice of the effects of other medicines which have a similar action in fevers, and produce a crisis in them.

The author has already said, that when a patient is attacked with fever, it often happens that there is undigested food in the stomach, which will therefore require to be evacuated. From the fever itself, likewise, other noxious matter is probably produced in the stomach, in some degree similar to that which we find covering the tongue. It is
necessary

necessary to evacuate such undigested food, because by remaining it may contaminate the food that may be afterwards thrown into the stomach, by exciting in it the acetous, putrefactive, or other noxious fermentations, and prevent it from being converted into a substance which is afterwards to be formed into chyle.

Vomiting in itself has a tendency, after the sickness which produced it is over, to occasion a glow or warmth over the whole body, followed by moisture on the skin, softness of it, an universal softness and relaxation of the whole muscles, a flow of fluids through the whole secretory vessels, a general tranquillity over the whole system, and a disposition to sleep.

Although vomiting induced by any means has this effect, in some degree, when the sickness occasioning it is gone off, yet it has not the same effect, in an equally powerful manner, when produced by any means whatever.

If

If vomiting be produced by tickling the throat, by introducing any solid substance into it, as a feather or the finger, or if by a cough the larynx be forced up into the throat, some sensible effect similar to what has been just described takes place. If preparations of antimony or ipecacuanha be exhibited so as to produce vomiting ; when the sickness is gone off, the appearances of crisis, which have been above described, arise in a much greater degree.

Although therefore all emetics, when the sickness is gone off which occasions the vomiting, have a tendency to produce appearances similar to the appearances which take place in the crisis of fever, and therefore actually tend to produce crisis in fever, yet they do not all tend to produce crisis of fever equally : therefore it is better to choose such substances as emetics, which have the greatest tendency to produce critical symptoms after the vomiting is gone off, than such as have a less tendency to produce the appearances similar to those taking place in crisis, in order that the emetic may have
a better

a better chance to produce a crisis in the disease.

It is therefore better to employ preparations of antimony or ipecacuanha, as emetics, in the beginning of a fever, than warm water, infusion of camomile, white vitriol, squills, &c. which have no tendency to produce symptoms similar to those which take place in a crisis of fever, independent of the action of vomiting.

It is not always that any of the preparations of antimony known produce vomiting, when exhibited to a man either in health or in a fever. Sometimes tartarified antimony in the dose even of several grains, does not produce vomiting but purging, given either in health or to a patient affected with fever. It is wished, however, that we should be certain of producing vomiting to occasion the evacuation of any noxious matter, such as has been described, from the stomach.

Ipecacuanha, the root of a plant, which the jealous government of Spain has prevented

the perfect investigation of, is very certain in its operation as an emetic, much more so than any other substance which is at present known. It has besides the same kind of power which antimony has, though perhaps not in so great a degree, of producing those appearances which take place in the ordinary crisis of a fever. It is therefore better to mix ipecacuanha with tartarised antimony, and exhibit them so mixed as an emetic at the beginning of fevers.

The next point to be argued is, the dose of the medicine we are to employ as an emetic at the beginning of fevers.

When a medicine is to be exhibited as an emetic under one view, it does not appear to be of much consequence how large the dose is. Let the dose be ever so great, the first evacuation would seem to bring up every thing which is superfluous, so that the superfluous part of the dose should no longer act. This consideration explains why the very various doses of emetics which have been exhibited in various cases,
produce

produce very often nearly the same effect. Though this be the case in many instances, it is not in all. It happens also in many instances, that a large dose of an emetic produces most violent vomiting, which is repeated many times with great distress to the patient, so that it would seem that an emetic may lie so long upon the stomach, before it is brought up, as to make an impression, which lasts after the emetic itself is entirely evacuated.

In fevers the violence of the exertions, when an emetic thus continues to operate, perhaps six or eight times, in the first place exhausts the force of the system, which is not to be thrown away in this disease, and therefore on this account too large a dose of the emetic should be avoided.

Moreover, it has already been observed, that when any medicine is made to act in too great a degree, it loses its proper effect, and becomes a simple stimulant. So the action of vomiting itself, by being too frequently repeated, from exhibiting too large

a dose of the medicine, does not produce appearances similar to those which arise in the crisis of fever, so as to carry off the disease. For this reason ipecacuanha and antimony do not produce these appearances, if given in too great a dose. Thus by giving too large a dose of these medicines as emetics, the effect of carrying off the fever either by the action of vomiting itself, or by the effects of the antimony and ipecacuanha, are frustrated.

The proper dose may be about eight grains of ipecacuanha, and one grain of tartarised antimony.

If an emetic of almost any kind, which takes up a very small volume, be exhibited, if there should be nothing in the stomach to be evacuated, there arises an effort to evacuation, or in other words a reaching, which is attended with a great deal more uneasiness and pain, than if there was a quantity of some substance in the stomach to be evacuated. This has induced practitioners to give, after an emetic has been exhibited,

exhibited, watery fluids to drink, so that there should be something to be evacuated, in order to take off the uneasiness and pain of the reaching.

At the beginning of a fever emetics, as we have just observed, are employed for two purposes: First, to evacuate from the stomach any undigested food which was contained in it when the fever took place, or thrown into it afterwards, or noxious matter formed in the stomach in consequence of the fever. In the second place, by the action of the vomiting, and of the medicines employed as emetics, joined together, to induce a crisis to the fever, so as to put an end to the disease.

For the first of these purposes, to wit, evacuating noxious matter from the stomach, if it were undigested food, two or three evacuations by vomiting are certainly sufficient, and especially if after the first evacuation a quantity of warm watery fluid be thrown into the stomach. If noxious matter be formed in the stomach itself in

consequence of the fever, and if that should affixed to the stomach, as the crust is to the tongue, no force will ever separate it, and if it should not be so affixed, two or three evacuations will be sufficient to carry it off; so that if two or three fits of vomiting should take place, it is sufficient for all the purposes that are wished for from the vomiting, and will not prevent either the act of vomiting itself, or the effect of the medicines, which have been enumerated as proper to produce it, from bringing on the appearances which take place similar to those that arise in the ordinary crisis of fever.

It does not seem indifferent at what time of the day an emetic is employed, if we wish it to produce any other effect than simply to evacuate the noxious matter contained in the stomach in fever.

In the first place, the operation of vomiting, after it is over, tends to produce sleep. Mankind generally are disposed to sleep about nine, ten, or eleven in the evening. If then the disposition to produce sleep,
brought

brought on by the emetic, coincides with the ordinary time of the twenty-four hours in which there is a disposition to sleep, the two together will be more powerful in producing their effect, than either of them alone. The rest thus procured by this double disposition will be sounder and more refreshing, than it would have been from either of them simply, and will tend to restore and support the strength of the patient. Moreover, it has been observed, that sleep produces a disposition for all derangements of the system to go off, and consequently fever; it therefore increases the chance of the action of the vomiting, and the power of the remedies employed to produce it, in occasioning the appearances which arise in the ordinary crisis of fever, and consequently in carrying it off.

Secondly, it has been observed, that the exacerbation of a regular continued fever takes place generally between five and six o'clock in the evening, and that the effort to a crisis made in the hot fit is

strongest about three or four o'clock in the morning. If the emetic be then exhibited between seven and eight o'clock in the evening, the disposition to crisis produced by the vomiting itself, by the action of the substances employed as emetics, by the sleep, and by the ordinary effort of the fever itself, will all co-operate together so as to have a better chance of producing a crisis in the disease.

It would therefore seem, when we employ an emetic in a fever, to evacuate any noxious matter from the stomach which has got into or formed in it by the means above described, that it is better to exhibit in a moderate dose such substances as emetics, which, if they are not exhibited in such doses as to produce sickness, have a tendency to produce symptoms similar to those which take place in the ordinary crisis of fever. It seems also necessary to prevent the violence of the reaching by introducing some watery fluid into the stomach, but that it is better not to employ the watery fluid in too great a quantity, nor re-
peat

peat it too frequently. It is likewise better to exhibit the emetic about seven or eight o'clock in the evening. Thus the action of the vomiting itself, of the medicines employed to produce it, the sleep, and the ordinary effort of the evening paroxysm of fever itself, will all co-operate together so as to tend to bring on a crisis, and so terminate the disease.

If any one should think the author is too minute in these attentions, he must consider that if, by omitting any of them, a crisis should not be produced when it otherwise might have been, the patient may be subjected for a fortnight, or longer in some instances, at least, to a distressing and dangerous disease.

It happens sometimes, when an emetic is employed, that with every precaution the sickness will continue, and the patient shall pass a restless and distressing night, more so than would probably happen if no emetic had been exhibited ; but this must be left to be considered among the irregularities which
happen

happen in the disease. Nevertheless, it is necessary to employ an emetic to clear the stomach of any noxious matter that may be left in it from the last food that was employed, or that may be generated in it in consequence of the disease, in as much as such noxious matter would occasion much greater disorder if it was not evacuated.

It happens not uncommonly that when a patient has taken an emetic, especially if regulated as is described above, he falls in less than an hour after its operation into a quiet sleep; a gentle easy perspiration takes place at first, and increases into a sweat more or less profuse; all the secretory vessels are relaxed, and the skin and the muscles also; a perfect crisis is produced, and the patient is freed from the disease.

It happens likewise not uncommonly, that though perfect crisis does not take place, the fever is considerably alleviated, and goes through its remaining course with less danger to the patient.

The author thinks, that if a practitioner be consulted in the beginning, that is, in the first four or five days, an emetic should always be exhibited in a regular continued fever.

Independent of vomiting, preparations of antimony, such as have been described, have the power of producing appearances similar to those that arise in the ordinary crisis of a regular continued fever. These preparations of antimony have been employed in two ways to produce such crisis.

First, if some one of the preparations above described be exhibited in a dose just not sufficient to produce sickness (when they have been exhibited empirically this has not been much attended to) in the evening about six o'clock; if the same dose be repeated about half an hour past eight, and again at eleven; if the patient be laid in flannel or cotton, or some other bad conductor of heat, his head bound round with a cloth of the same kind, and small quantities of some warm watery fluid, such as barley water, be given frequently, so as to throw the patient

tient into a profuse sweat if possible ; and this sweating be kept up by repeating the preparations of the antimony every four, five, or six hours, as the patient can bear it, without occasioning any sickness ; and if this practice should be continued for four and twenty hours, it has happened, in many cases, that when the preparations of antimony, above described have been exhibited in this manner, a crisis has been produced, and the fever entirely carried off. This happens particularly if the remedy be exhibited in the first three or four days of the disease ; the crisis is thus very evidently the effect of the medicine. There is a degree of brilliancy in this practice which has made it be adopted by many practitioners who have a degree of empiricism.

It is to be observed, that such practitioners, and all empirics, have often exhibited antimony in this manner, or sometimes in one dose without repetition, at any time in fever, sometimes with success, but this will be considered afterwards.

The

The mode in which antimony appears to the author to have the best effect, with the least detrimental consequences, is, in the first place, to employ it as soon as possible in the disease; for it is more efficacious in the first attack of the fever, than in the second day of the disease, counting the days as has been before pointed out. It is more efficacious in the second day of the disease than in the third, and so on the third than in the fourth, &c.

It should be employed in the first place as an emetic, mixed with ipecacuanha, as has been already described. If the weather should be cold, it is better to lay the patient in cotton, and treat him as has been described, in the management of a regular continued fever left to pursue its natural course.

After having exhibited the emetic, as has already been described, when the vomiting has ceased, the patient being in bed, if he should continue sick and restless, as has been above described, which is sometimes

sometimes the case, about a grain of opium, or a dose of tincture of opium, equivalent to a grain, may be given without detriment, along with a little tincture of cinnamon or any other aromatic. This medicine should only be exhibited under the circumstances of the patient's continuing sick and restless, in which case it takes off the sickness, and suffers the antimony to act.

Six hours after the action of the emetic is over, if the patient should be awake, a dose of one of the preparations of antimony above described, should be exhibited in such quantity as the stomach can bear without sickness. If he should be asleep at this interval from the last action of the emetic, as soon as he awakes it should be given.

The author prefers tartarised antimony, prepared as is described above, in the last edition of the Pharmacopeia of the London College.

The dose of tartarised antimony the author would exhibit, in the first instance,
is

is two sevenths of a grain, or if the tartarified antimony be dissolved in wine, as is above described, in the *vinum antimonii tartarificati* of the Dispensatory, thirty drops of this solution dropped out of such a vial as is commonly made to contain two ounces in this country.

The author is sensible of the uncertainty of measuring any thing by drops. The quantity contained in a drop depends upon the viscosity of the fluid dropt. Four drops and an half of alcohol, for example, dropt from the same vessel, weigh only one drop of water, the alcohol being much less viscid than the water.

Again, the size of a drop depends upon the thickness of the lip of the vial from which it is dropt, or rather on that part of the lip from whence it is dropt. These difficulties may be easily obviated, by trying how many drops of any fluid dropt from one part of the lip of any one vial measures or weighs. If the vial be not above four-fifths full, the same number of drops, if
they

they exceed twenty, will be found always nearly of the same measure and weight.

The author prefers this mode of determining the dose as the easiest and most readily measured.

It has this advantage, that if thirty drops of the *vinum antimonii tartarificati* should produce, on its first exhibition, any nausea, it may be diminished by four or five drops on the second exhibition. If upon this second exhibition it should produce no nausea, or if upon its first exhibition, in the quantity of thirty drops, no nausea should ensue, an additional quantity of two drops may be added to each dose, until the greatest quantity is found out that the stomach can bear without nausea. The author has already observed, that nausea prevents the medicine from having such a disposition to produce symptoms similar to those that arise during the crisis of fever, and so carry off the disease. The practitioner can therefore thus ascertain the exact dose which can be given without producing nausea.

If

If the author should be mistaken in thinking that tartarised antimony, prepared as has been described, is the best preparation of antimony for producing crisis in fever already known; or if some better preparation should be found out; yet as the stomachs of different men, or the stomach of the same man at different times, are differently impressed by the same doses of almost all medicines, he conceives that some mode should be taken similar to that which has been described above, to ascertain what quantity the stomach can bear of the preparation of antimony employed without nausea, and that it should be exhibited in that dose.

Along with the first dose of antimony to be exhibited in six hours after the last operation of the emetic, it may be proper to give a moderate quantity of some aromatic, so as to render it more agreeable to the stomach of the patient, such as infusion or distilled water of mint or cinnamon, or any other medicine of the same kind.

If the emetic exhibited should have produced a quiet gentle sleep, and the symptoms of a crisis appear; if the pulse has returned to the ordinary number of pulsations in a given time, and the patient should appear to be entirely freed from the fever; yet it will not be superfluous to repeat the preparation of antimony in the manner described, as no mischief whatever can arise from it, and it may secure the patient from the return of the disease.

After a dose of antimony is thus exhibited, it is to be repeated at four or five, or six hours interval.

The interval is to be determined from the effects which this dose has produced.

If the patient has had a crisis produced by the emetic, and a general freedom from the disease has taken place only with some languor, it will be sufficient to repeat it every six hours, and continue it for twenty-four hours.

If

If hardly any relaxation should have taken place in consequence of the emetic, but all the symptoms of fever, such as great depression of strength, weight about the precordia, pain in the forehead, dryness of the skin, &c. should remain in a great degree, it will then be proper to repeat it every four hours, and continue such repetition for four or five days.

If a preparation of antimony is given in this way at the beginning of fever, and continued for four or five days without producing a crisis, so that the fever is cured or converted into an intermittent, it rarely produces a crisis afterwards; nevertheless it often makes the relaxations greater, prevents or diminishes delirium, and makes the whole fever go on with less violent symptoms. It is better therefore to continue to exhibit such a dose of the preparation of antimony, as the stomach will bear without nausea, every six hours. When symptoms of weakness begin to appear, or if the antimony should produce sweating, purging, or any other topical evacuation, without re-

lieving the fever, it is immediately to be omitted.

It happens, in many instances, that in the course of this time the patient has a moisture produced in the skin, a lateritious sediment takes place in the urine, the skin by degrees grows soft, the tongue begins to grow moist on the edges, and is cleared of the crust that forms upon it, all the other critical symptoms take place gradually, and the patient is freed from the disease.

If either the symptoms of the attack of the disease should be so violent as to give little hopes that the patient will recover, if the disease should pursue its ordinary course, or such an epidemic should be prevalent as destroys the greatest number of patients afflicted with the disease; in such cases, perhaps, it might not be improper to force a profuse sweat in the manner that has been described.

Unless however there should be little hopes of the patient's recovery if the disease
should

should go on in its ordinary progress, such means of occasioning sweating ought by no means to be employed.

First, because sweating, though it be one of the appearances that take place in the ordinary crisis of fever, yet it is very far from being the only one; or, not only the secreting vessels of the skin are relaxed, and secrete a larger quantity than usual, but all the other secretory vessels are equally relaxed, and also the muscles and whatever other part is relaxed in the ordinary crisis of fever. We see also that profuse sweating takes place sometimes in a regular continued fever without any relief to the disease.

In the second place, every unnecessary evacuation tends to weaken the patient, and give him a less chance of being supported through the course of the disease if a crisis should not be produced.

Therefore it is not proper to attempt to produce profuse sweating, if there be any

tolerable chance of the patient's recovery, provided the disease should be left to pursue its ordinary course.

Hitherto the author has been supposing the patient to apply to a practitioner in the first day or two of the fever. In that case, provided the disease be a regular continued fever, by employing preparations of antimony in the manner described, symptoms similar to those which take place in the ordinary crisis of fever will be produced, as far as the author can judge from his experience, in one half, perhaps he thinks he can say certainly in one third of regular continued fevers.

If no medicine has been given during the first days of the disease, or if no emetic has been exhibited, it will be proper to employ an emetic in the manner which has been mentioned any time in the first week of the disease, or even on the eighth or ninth day, especially if there should be a greater foulness of the tongue, or more nausea than
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in proportion to the other symptoms of the disease.

If an emetic should have been employed at the beginning of the disease, and the patient at any time afterwards during the course of it should have a greater foulness of the tongue, weight upon the stomach and nausea, than in proportion to the other appearances of the disease, it is proper to repeat the emetic. In this case, about five grains of ipecacuanha should only be given, which rarely fails of proving emetic. It should be exhibited in the evening, but the other regulations that have been laid down for the exhibition of an emetic at the beginning of the disease, are not necessary to be attended to.

If no preparation of antimony has been exhibited on the first two or three days of the fever, the exhibition of it afterwards will have less chance of carrying off the disease; for after the fever has continued for longer than three days, the system has acquired an habit which renders the disease

more fixed. Although the sooner the preparation of antimony is employed, the production of a crisis or gradual going off of the disease, by critical symptoms taking place after each other, is more probable, yet the fever in many instances will be carried off by the exhibition of it before the end of the second week of the disease. The sooner however it is exhibited, it will have the greater chance of removing the fever.

Although preparations of antimony should not produce a crisis so as entirely to carry off the fever, they produce a crisis in many cases, which though not quite perfect, yet converts the disease into an intermittent fever, which is a disease much easier managed than a continued fever.

Supposing preparations of antimony not to produce such a crisis as to convert a continued fever into an intermittent, or carry off the disease, yet it happens in many cases that they give great relief to the patient, so that the head-ach is diminished or entirely carried off, such a degree of delirium does
not

not take place as otherwise probably would have done, the primæ viæ are not so much disordered, and the fever pursues its course without so much distress and danger to the patient as it otherwise would have done.

It happens sometimes that there is great hardness, fulness, and strength of the pulse, as well as obstruction ; that with these there is flushing of the face and redness of the eyes in the first two or three days of the fever, and that other symptoms of general inflammation take place in such a degree as to render it necessary to take away a quantity of blood ; it then becomes a question whether preparations of antimony should be employed immediately at the beginning of such fever, before blood is taken away.

This is a case which happens much seldomer than would be suspected from what authors have written on this disease, and the argument will be entered into in that dissertation in which the irregularities that take place

place in continued fevers will be treated of.

If upon exhibiting preparations of antimony some one evacuation should take place, without a relaxation of the other secretory vessels, the antimony should not be persisted in. If profuse sweating should be produced, and at the same time the tongue should remain dry and covered with a fur, and the patient should remain costive and the other parts contracted : if a lateritious sediment should appear in the urine, or a flaky white sediment, the skin remaining dry and contracted, and the tongue dry and covered with a fur : if the patient should be purged, the skin remaining dry at the same time ; in any of these cases there is little hope of antimony being of any kind of use if the system should continue in this state for forty-eight hours. It will rather tend to weaken and destroy the patient, and therefore ought not to be continued.

It

It is next to be considered whether there is any other medicine which has the same effect with preparations of antimony; that is, whether there be any other medicine that will induce the appearances which take place in the ordinary crisis of fever, so as to carry off the disease,

In the history of medicine that we are able to collect from the Greek and Roman authors, whose writings have come down to us, there is one instance only of a medicine having had this effect, to wit; when the physician of Alexander the Great exhibited to him a medicine, which is said to have occasioned the appearances which ordinarily take place in the crisis of fever, so as to carry off the disease in less than twenty-four hours. We have no trace of what this medicine might be, and it is singular that the same medicine should not have been exhibited to him again in that remittent, which he caught by surveying the marshes of the Euphrates, near Babylon, in order to have them drained,

Cold water was exhibited by Greek physicians, in fever, often evidently with a view of immediately putting an end to the fever. From the best information the author has been able to make out from perusing their writings, they exhibited it reduced nearly to the freezing temperature, in the quantity of from one to two quarts at once, so as to produce great evacuation by vomiting, purging, and sweating.

It was by no means the practice of the ancient Greek physicians, who were the principal and almost only practitioners in the Roman dominions, to give watery fluids, or indeed any thing to drink at the beginning or during the paroxysms of fever. In Petronius's satire, one of Trimalchio's guests says, that a man, whose funeral he had been at, was a very obedient patient to his physicians, for he did not suffer a drop of fluid to pass his lips for seven days, and he died notwithstanding.

It was not the practice of the Greek or Roman physicians to give cold water constantly

constantly to drink in small quantities, but in a large quantity at once, perhaps with a view of drowning out the heat, which they considered as the essence of the disease. It was to be drunk, as Celsus says, *ultra satietatem*. It is described however as bringing on those appearances which take place in the ordinary crisis of fever, and in certain cases as carrying off the disease.

This not having been the practice during the last period of forty years, the author has had no experience of giving large quantities of cold water at once for drink, and cannot therefore say what its effect may be. During this time it has been common, in consequence of Dr. Boerhaave's idea of rendering the fluids thinner in fever, to exhibit small quantities of warm watery fluids very frequently for that purpose.

That warm watery fluids, forced upon the patient often in fevers, is of no manner of use, the author is obliged to believe from repeated experience. It would be easy to shew that every reason, on which this
practice

practice was introduced, was perfectly without foundation, but as no knowledge whatever is to be gained by the discussion of this point, the author does not think it worth while to draw the reader's attention to the subject.

It was also a practice among some of the ancient physicians to employ the cold bath, in certain cases of fever, to produce a crisis, and sometimes the warm bath; but the history of both these practices is so little detailed in their writings, that the author has not been able to make out their effects, or whether they actually occasioned symptoms similar to those that take place in the crisis of fever, or whether they actually carried off the disease or no.

The author has had good information, that both in Italy and Spain drinking large quantities of cold water at once, as well as using the cold or warm bath, are still in practice in diseases called by them febrile, but he could never from their books, or from the conversation of the physicians of these

countries he has seen here, make out the idea they affix to febrile diseases, nor the actions of these remedies.

The author must therefore dismiss this subject, viz. the application of cold water, as nothing is known of it at present from any thing which can be considered as evidence. It requires half a century at least to destroy the bloom of novelty which deludes when a new medicine is recommended, or fix any evidence in medicine. It was a great deal longer before the bark of the cinchona was brought into general practice in intermittent fever. It was longer still before mercury was allowed by regular practitioners to be employed in medicine.

The next substance which has a tendency to produce those appearances which take place in the ordinary crisis of fever, is the root of ipecacuanha, an American plant, and which could not therefore be known to the ancient Greek and Roman physicians.

The

The root of this plant was first brought into practice as an emetic.

There is a tendency in mankind to employ almost every thing in medicine ; a tendency perhaps given them by the Almighty to supply that want of the knowledge of the ground on which medicines act, medicine being a science of so very great difficulty. Of the substances known in those countries with which Europeans were acquainted before the discovery of America, almost every thing had been tried and even celebrated in medicine. Dead men's bones, cobwebs, and the rags that enveloped the bodies of the ancient Egyptians, as well as opium, colocynthida and squills. Whenever, therefore, new countries were discovered, and in consequence new plants, we constantly find practitioners in medicine using them in disease ; so the root of the ipecacuanha was found out to have an emetic quality, and was employed first as an emetic. Afterwards, when it came into Europe, its other effects began to be investigated, its action in rheumatism, in diarrhoea and dysentery, and

in all which cases it seems to be analagous in its operation with preparations of antimony.

The present enquiry is to determine how far it is analogous to preparations of antimony in fever.

It has been already mentioned, that if it is wished to produce vomiting at the beginning of fever, it is better at least to mix ipecacuanha with preparations of antimony, it being surer of acting as an emetic.

If at any time, during the progress of the disease, there should be a considerable degree of sickness, especially if it should be attended with a thick brown fur upon the tongue, though an emetic has already been exhibited, it is useful to employ from five to ten grains of ipecacuanha to act as an emetic, as has been already observed. It not only throws off any noxious matter that may be in the stomach, but also produces moisture upon the skin; the sickness is relieved, and sometimes a complete crisis takes place, and the fever is carried off.

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If

If a symptomatic purging should take place in fever, without any relief of the disease, if such purging should take place along with the fever, or soon after its beginning, as far as the author's experience goes, ipecacuanha is better used alone as an emetic. In this case it is also better to give such small doses of it as just not to produce sickness, every four or six hours. They have a better chance of carrying off the purging, and likewise of producing symptoms similar to those which arise in the ordinary crisis of fever, and so entirely carry off the disease, than preparations of antimony.

In all cases of fever, ipecacuanha seems to act much in the same manner as preparations of antimony, in producing symptoms similar to those produced by preparations of antimony, and in many instances carry off the disease, though not with the same certainty.

If we give ipecacuanha instead of preparations of antimony, the stomachs of most patients will bear a grain without occa-

sioning sickness, and few stomachs will bear two grains without sickness.

In other respects the same attentions are to be paid when we employ ipecacuanha, as when we employ preparations of antimony.

Several of the neutral salts, such as kali vitriolatum, ammonia muriata, ammonia acetata, and some others, have been employed in fevers with a view of producing the symptoms which take place in the ordinary crisis of fever, in order to carry off the disease.

The author has seen moisture of the skin arise after exhibiting them, but he cannot say that in any one instance he could determine that they brought on a complete crisis in a regular continued fever. During the exhibition of these neutral salts, an ordinary crisis sometimes takes place, but not oftener than if they had not been exhibited, and therefore such crisis cannot be said to arise from their exhibition.

The author then upon the whole does not know of any remedy which has a tendency to produce a crisis in fever oftener than it would have taken place if no remedy whatever had been exhibited, whether such remedy has a tendency to produce vomiting or not, excepting preparations of antimony and ipecacuanha. Possibly it may be admitted, that the ancient Greek physicians for this purpose employed cold water internally, or the cold or warm bath, or some other remedy with which we are now totally unacquainted, with good effect.

Semicupium, or fomenting the lower extremities with warm water, is similar in some respects to the warm bath.

This practice has been used, especially when the patient is affected with delirium in the second week of the disease.

This practice is different from the warm bath, in as much as it can be employed without greatly disturbing the patient, and in
consequence

consequence without wearing him out by exertion.

When fomentation of the lower extremities is employed, it should be applied in the evening. The bottom of the bed clothes, under the patient's lower extremities, should be covered with some covering which will prevent them from being moistened, which may be taken away after the fomentation is no longer applied.

The fomentation should be performed by moistening flannel, or any thing which is a bad conductor of heat with water, heated to about an hundred degrees of Fahrenheit's thermometer. The flannel or other substance employed should be wrung out, so as to leave very little moisture in it; afterwards it is to be applied to the legs and feet until it begins to cool. As soon as the flannel begins to feel cool, it is to be removed, and fresh flannel is to be applied moistened with warm water. The time of cooling will be different according to the heat of the atmosphere at a medium about five minutes.

Fresh flannels are thus continually to be applied for about half an hour ; the covering of the under part of the bed clothes is then to be removed, and the upper part to be brought over the lower extremities of the patient, and he is afterwards to be left quiet.

It sometimes happens that a moderate sweat breaks forth, the patient falls asleep, and is considerably relieved. The author has seen in a few cases, but very few in proportion to those in which this practice has been employed, that a complete crisis has taken place, and the patient has been freed from the disease. In several cases the patient has slept, and the delirium has been considerably relieved. In the greater number of cases, however, no advantage whatever has arisen from the application, yet as it hardly tends to exhaust the patient, it is worth while to employ it.

Some, instead of moistening the flannel or other clothes with water, have employed mucilaginous substances dissolved in water, such

such as decoction of marshmallow root, &c. and some have employed decoction of poppy heads. The author's practice has not ascertained that any advantage has been gained by the addition of either of these; in cases where there have been appearances of putrefaction, some have added a small proportion of vinegar. This addition seems, as far as the author can judge from the cases in which he has seen it employed, rather to have prevented the good effects of the application; but of this the author is not quite sure.

An inflammation of an exterior part of the body in many cases carry off diseases, which have arisen in other parts of the body.

Perhaps an inflammation of an interior part may also carry off diseases which have taken place in other parts of the body.

Fever is one of the diseases which is carried off by an inflammation of either an exterior or an interior part of the body.

It has been before observed, that an inflammation arising at the beginning of fever, particularly in the first paroxysms of the disease, not uncommonly carries off the fever altogether. It has been also observed, that inflammation often produces very considerable affection of the whole system, which many practitioners, both ancient and modern, have called and considered as fever. One principal scope of these dissertations is to point out, that every affection of the system, in which there is frequency of the pulse, and an increased degree of heat, is by no means fever. Such affections of the system almost always depend upon a continuance of their cause. When their cause is removed, the general affection of the system goes off also, while the cause of a fever seldom hath any effect upon it after having made its first impression. If it is removed, the fever almost always goes on; if it remains, the fever is rarely affected by it, but goes on through the same ordinary progress as if the cause had been entirely removed.

Thus

Thus an inflammation of the pleura generally produces at the time hardness, fullness, strength, and regularity of the pulse, which however is much more frequent in the patient than in health. With this alteration of the pulse from its common state, there is an increased heat, both as to the sensation of the patient, the physician, and to the thermometer. There is a crust formed upon the tongue, sometimes white, more frequently of a yellowish hue; there is a pain in the internal part of the head, flushing in the face, and often delirium; there is less appetite, and there are other disorders in the system. If the inflammation of the pleura be cured, as it sometimes is, by one copious bleeding, that is by taking away from four and twenty to thirty ounces of blood from the arm, all these appearances subside in less than twenty-four hours, and the patient recovers his health, excepting that he is somewhat weakened: whereas, let a fever arise in consequence of exposure to cold or to infectious vapours, or almost any other cause of fever, the appearances continue and go through their

their ordinary course equally, whether the cold or infection continue to be applied or not.

The author has already observed, that it happens often in fever that inflammation takes place at the very beginning of the disease, in the first or second paroxysm, and that such inflammations immediately carries off the disease without any thing like the appearances which take place in the crisis of a fever, but that the fever simply ceases. If it be such an inflammation as produces no affection of the system, as external inflammations often do not, then the symptoms of the inflammation in the part affected with it only continue. If the inflammation be such as produces frequency of pulse, heat, and other general affections of the system, though it should arise from fever, if it arose from any other cause than fever, the frequency of the pulse, and other symptoms, will be the same as if it had not arisen from fever, and continue although the fever be cured, and subside when the inflammation is carried off by means which would not affect the fever. Thus suppose in the second day of fever a pleurisy should

should arise and cure the fever, although the fever be carried off, there remains frequency of the pulse, foulness and dryness of the tongue, loss of appetite; great heat, urine remaining transparent when it has stood for several hours, &c. These appearances do not in the least constitute fever, but entirely depend on the pleurisy; and if the pleurisy be cured by bleeding, for example, all these appearances subside, although the bleeding would have had no effect on the fever, or carried off any of its symptoms, if the pleurisy had not first arisen, cured the fever, and produced these symptoms.

The knowledge that fever might be cured by exciting inflammation in some part of the body, may possibly be derived from physicians observing that a fever was actually cured in many instances, when an inflammation arose in some part of the body, even when no application, as far as the physicians could judge, was applied to excite that inflammation. The physician might think, therefore, that by applying something that would produce an inflammation in some part of the
body,

body, the disease might be carried off, and that an inflammation produced by any means might have the same effect with that which had arisen in the fever itself, without any apparent cause excepting the fever. He might therefore produce an inflammation in some part of the body by stimulating it with a view of carrying off the fever.

Perhaps rather that strong disposition in mankind not to wait the tracing of knowledge by experiment might make physicians suppose, that the fever depended upon some noxious matter being diffused through the whole system, and that the application made might draw like a magnet that noxious matter into one part of the body, and produce an inflammation in that part instead of a fever in the whole.

It is still the opinion of many practitioners, that when an inflammation carries off a fever, if it be such an inflammation as tends to terminate in suppuration, the matter that occasions the fever in the whole system is accumulated in the inflamed part.

When

When the abscess is formed and breaks, and the pus is evacuated, many practitioners still believe that the matter which first produced the fever is evacuated. Other inflammations, such as arise in the skin for example, do not terminate in suppuration, but in a blister rising, that is the scarf-skin separates from the true skin, and contains in it principally the superfluous water and the neutral salts of the blood, sometimes along with a little serum, and sometimes also coagulable lymph, which coagulates and gives some degree of solidity to the matter contained in the blister. The scarf-skin afterwards breaks, and leaves the skin excoriated till a new scarf-skin is formed; until that happens a quantity of the superfluous water of the blood, together with the neutral salts, flow out. In this case it has been supposed that the fluids, or whatever other matter it might be that occasioned the fever, continues to be evacuated, and that so the fever is carried off.

The objections to this opinion are very strong: first, the author in his first dissertation upon this subject, has endeavoured
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to shew that a fever is a disease of the living solids only, and that all the matter of the body, during the progress of many fevers, had exactly the same properties as if the patient were in perfect health.

In the second place, supposing there was any matter existing in the body which occasioned the fever, that matter must either be confined to some particular part of the body, or circulated in the blood vessels, or be thrown out by the exhalants and taken up by the absorbents, and so circulated. In the first case, if it was lodged in any particular part of the body, an inflammation in another part might excite the action of the absorbents of the part where the noxious matter was lodged, so as to occasion it to be taken up and carried into the general circulation. If they did not take it up, it would remain in the part where it was at first deposited, and where it produced the fever, and so the inflammation which carried off the fever could not possibly occasion matter to be brought to the inflamed part, as is evident to every person tolerably acquainted with the anatomy of the human body

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as it is now known. To bring the matter from a particular part where it produced the fever, into a part whose inflammation cured the fever, it is necessary that it should be absorbed, and carried into the general circulation. Supposing the matter to be absorbed and carried into the general circulation; or supposing it is originally blended with the whole fluids in circulation, so as to occasion the fever, the same argument will apply, and is as follows.

If any matter be in general circulation, it is mixed minutely with the whole blood. If it passes through the blood-vessels only, or if it passes also through the exhalant, into the cavities and absorbents, in both cases it is mixed with the whole blood returning from every part of the body, in the right auricle of the heart. The motion which takes place from the right auricle to the right ventricle, mixes it still more thoroughly with the whole blood. It is still more perfectly intermingled with the whole of the fluids in passing through the lungs, and again in the left auricle and left ventricle, so that it must be blended most perfectly, and most minutely in the aorta, so
intimately

intimately as to be equally distributed through all the vessels. It passes through them with such velocity that no difference of specific gravity can prevent its being equally distributed to every part of the body. If then there be no particular structure in any part of the body by which such matter may be caught, it will circulate equally through the whole body.

If there was any structure in any part of the body in its ordinary state, by which the matter of a fever could be caught, and would produce inflammation, then it would be the inflammation of that part only which would carry off fever. But the inflammation of any part of the body indiscriminately, in many instances, carries off fever, and therefore there must be a change in the structure of the part in which the inflammation arises, in order to account for the matter's being caught in that part, no such change has been shewn by any experiment, nor any cause of such change, so that we have an unknown thing, endeavoured to be accounted for by a thing equally unknown,

We must therefore simply conclude, that an inflammation arising in any part of the body without any apparent cause, excepting the fever itself, in many cases terminates the fever. How, or why this happens, is not as yet investigated; we are only led from this fact to enquire, whether inflammations excited by certain causes which produce that effect may not be employed to carry off a fever, as well as those which arise without any apparent cause.

The author has seen in several instances inflammation, produced by applying stimulants to a part of the body, when a patient is affected with fever, carry off the fever entirely in the space of twenty-four hours.

When an inflammation is excited in the exterior parts of the body, so as to carry off a fever, it does not produce appearances similar to those which take place in the ordinary crisis of fever; but the fever simply ceases, the head-ach goes off, the tongue becomes clean, depression of strength leaves the patient, all the evacuations come

into their ordinary state as in health, the patient sleeps, and has his appetite restored.

Though an inflammation produced in any exterior part of the body now and then carries off fever entirely, yet it has but seldom this effect ; it only commonly alleviates the disease, or takes off some of the symptoms ; it sometimes carries off head-ach or diminishes it ; it diminishes, rarely carries off delirium entirely if it has arisen ; and so of the other appearances which take place in fever.

Since exciting an inflammation sometimes alleviates and carries off the symptoms of fever from particular parts of the body, if it should happen that one part of the body should be more affected in the fever than the other parts, an inflammation excited near that part is more apt to carry off the particular affection of that part, than one excited at a distance. If, for instance, there should be great pain in the forehead, an inflammation excited behind the ears is more

apt to carry off that pain, than if it had been excited in the back ; if there should be great affection of the breast, an inflammation excited in the skin of the breast will be more apt to relieve the breast, than if it had been excited in the extremities.

There are several substances which, when applied to the skin, will excite inflammation, viz. mustard seed bruised, horse-radish, and many other of the class tetradynamia of Linnæus ; many of the species of allium ; euphorbium, and other resinous substances ; as well as cantharides, ammonia, and many others. Of these modern practitioners have generally chosen to employ cantharides to excite inflammation in fever, sometimes mustard seed.

If cantharides be powdered, and mixed with an oily or watery substance, and applied to the skin, they excite an inflammation in the skin ; this is followed by a blister, in which the scarf-skin is raised from the true skin, so as to contain in it a watery fluid. When the scarf-skin is broke, this

fluid flows out, and the same kind of fluid continues to ooze out from the skin for some time afterwards.

Upon examining this fluid the author has found it to contain water, in which is dissolved natron muriatum, ammonia muriata, and ammonia phosphorata, with a little mucilaginous matter, sometimes serum. The fluid oozed out therefore contains the superfluous water, together with the neutral salts commonly contained in the blood-vessels and the putrescent mucilage. Nothing, therefore, which is not commonly contained in the blood-vessels of a man in health, is found in this fluid, but the superfluous water, neutral salts, or putrescent mucilage of the blood, were never known to occasion fever in a man in health. There is therefore no reason to suppose, that it is this particular fluid which occasioned the fever, or that this evacuation is of any consequence; it is not in sufficient quantity to weaken the patient. The whole effect, therefore, of the application of cantharides, in as far as they produce this evacuation, must be
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considered as of no consequence; it is the inflammation only which carries off the fever or its symptoms.

The juice of cantharides is often absorbed by the vessels of the skin, and carried into the general circulation of the blood, as is evident from its stimulating and occasioning inflammation of the neck of the bladder, when cantharides are applied to the skin, so as to inflame it.

Some have been of opinion that the juice of the cantharides so absorbed produced some effect upon the matter which occasioned and kept up the fever: such opinion, however, is not founded on any experiment. That there is any peculiar matter in the body keeping up a fever has not been shewn by any experiment, much less has it been shewn that the juice of the cantharides has any effect upon such matter. This opinion, therefore, resting upon nothing more than an idle dream, it cannot be made a foundation for any medical practice.

Many animal poisons absorbed, and carried into the system by their action on the irritable parts, occasion spasms or involuntary contractions of the moving parts of the body. The same effect is also now and then produced by the juice of cantharides, when it is absorbed and carried into the system. The author has, in several instances, seen *subfultus tendinum*, in women especially, and also more violent spasmodic affections, arise from the application of blisters in fever as well as in other diseases; the absorption, therefore, of the juice of cantharides, when it has this effect, so far from being useful, is evidently hurtful. But this does not happen often enough to prevent cantharides being used.

Cantharides are therefore better employed to excite inflammation with a view to carry off or alleviate fever, than other stimuli, as they most readily produce inflammation, the inflammation produced by them is carried off the easiest, and is more readily kept up if that should be wished; though sometimes the absorption of their juice produces

duces spasmodic affections, which occurs but rarely, and soon go off, if the cantharides are no longer applied, generally in less than twenty-four hours; though they are apt to produce strangury, which may be obviated or alleviated by employing mucilaginous medicines, such as gum arabic dissolved in barley water.

How these mucilaginous substances produce their effect, the author cannot satisfy himself, but that they do produce the effect in many cases is certain. The author has several times applied cantharides so as to excite inflammation to more than forty patients running. To the one half of them he has given mucilaginous substances dissolved in water, and in the other half has not; many fewer of those patients who took the mucilaginous substances were affected with strangury, than of those to whom the mucilaginous medicines were not exhibited.

Some have preferred the application of mustard-seed, or some other of the class tetradynamia and genus allium, to

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the feet and legs in cases of delirium in fever.

This practice seems to have arisen from the doctrine of derivation, viz. to derive the matter as far from the head as possible, which is mere hypothesis. In practice it is found, that if any particular part of the body be afflicted with a disease, an inflammation produced in another part carries off the disease more certainly, if the inflammation is excited near the diseased part, than if excited at a distance. The proof of this, however, would be a digression too long to be entered into here, more especially as he believes it is generally acknowledged.

Suppose then that cantharides are preferred to excite inflammation in fever, the next question will be in what cases such inflammation should be produced.

Supposing that a patient is seized with a regular continued fever, and that the practitioner had no other means of putting a stop to the disease excepting by exciting an inflammation ;

flammation ; or supposing that he has employed preparations of antimony or other medicines already enumerated, without being able to induce a crisis in the fever ; or even supposing that there were other means of inducing a crisis to the fever or carrying it off immediately without any critical symptoms ; and supposing the fever was perfectly regular and affected the whole system equally, in any of these cases it is often worth while to attempt to carry off or alleviate the fever, by exciting an inflammation, by means of cantharides in the skin between and over the scapulæ about six inches square. If the fever should be carried off by this means, the inflammation may be suffered to go off and the blister to heal.

The circumstances being the same, and the cantharides having been applied, and an inflammation produced, if the fever should not be carried off, nor in the least alleviated, the application of cantharides, or any other stimulant to produce inflammation a second time, rarely relieves the disease, and therefore it is not worth while to keep up or re-
new

new the inflammation of that part or any other part of the body ; it will only wear out the system, and give the patient a less chance of sustaining the ordinary course of the disease

Supposing the circumstances are the same, and the disease is alleviated, but not carried off, it may be adviseable to excite a new inflammation after the first is carried off. If this new inflammation should not carry off, or very much alleviate the whole disease, a third inflammation is not to be attempted. The constant stimulus kept up by the remedies employed to excite a third inflammation, and the inflammation itself, will wear out the patient so much, that no probable advantage arising from it can compensate for the mischief.

When a patient is going through the long progress of a fever, which takes up perhaps one and twenty days, or even longer, when no medicine has been tried or has been found capable of preventing it continuing its ordinary course, the practitioner,
and

and much more those about the patient, lose their patience, and the latter wish that the practitioner would exert himself, and do something efficacious. In this case he is often compelled by those about the patient to apply cantharides to excite inflammation, notwithstanding the inflammation will probably be of no manner of use, but tend to wear out the patient. The relations and nurse, and by-standers, are satisfied with what they call a fine blister, and the practitioner's doing something. This certainly ought to be no inducement to a practitioner to torment the patient with an additional disease, or to wear him out by producing additional action; and so give him a less chance of going through the ordinary course of the disease.

It happens often that some part of the body is more affected in fever, than in proportion to the affection of the system generally. This forms an irregularity in fever; but not to have to recur to the excitement of inflammation again, the author means to notice it here.

Sometimes

Sometimes there is a much greater head-ach, that is, pain in the exterior part of the forehead, or all round the head, than in proportion to the febrile affection of the other parts of the system. In this case, at the very beginning of the disease, cantharides applied behind the ears, so as to excite inflammation, often relieves the head-ach, and sometimes carries off the whole fever. The sooner the inflammation is excited, the greater is its power, and therefore under such circumstances it is better to apply them so as to excite inflammation and occasion a blister, in the first two or three days of the fever.

Sometimes delirium arises earlier than we should expect from the other appearances of the disease. In this case, an inflammation produced by cantharides, so as to occasion a blister to arise on the head after removing the hair, or on the skin of the neck, or between the scapulæ, has sometimes considerable effect in diminishing, sometimes carries off the delirium, and even sometimes it carries off the whole disease.

Sometimes

Sometimes the breast is more affected than in proportion to the appearances of fever in other parts of the body ; there is for instance sometimes a greater weight and oppression about the precordia, than for the appearances of fever in the other parts of the body ; sometimes greater difficulty of respiration, attended with cough ; sometimes greater frequency of the pulse. In all these cases, when they arise from greater affection of the breast, exciting an inflammation in the skin over the sternum, has often given considerable relief, sometimes has carried off the whole fever.

It is to be remarked in all these cases of topical affection, that if the first inflammation excited, or blister produced, neither alleviates the appearances in the particular part of the body, nor diminishes the whole fever, a second or third inflammation, excited by cantharides or otherwise, has seldom any beneficial effect, but tends to irritate the whole system and wear out the patient, so as to render him unable to be supported through the remaining progress of the disease.

If

If the inflammation so excited should have given considerable relief, in that case keeping up the inflammation, or which is preferable, renewing it after it is gone off, is often useful.

In all cases where inflammation is excited either to carry off the fever totally, or to alleviate the symptoms when they have taken place in a greater proportion in one part than in the whole system, the sooner it is excited, the more it is likely to prove efficacious, excepting there should be great hardness, fulness, and strength of the pulse, and other appearances which would render evacuation by bleeding necessary, but this is rarely the case. The practice, however, has rather been to leave the excitement of inflammation till later in the disease, with a view perhaps to the practitioner's having something to do to satisfy the patient and bye-standers, rather than appear to allow the disease to go through its ordinary course.

It often happens that in the course of a regular continued fever delirium takes place.

This

This delirium has been described in the former part of this dissertation, as of two different kinds: the first, in which there is no appearance of affection of the brain, either when the patient is alive, or upon dissection: the second, in which, when the patient is alive, there is fulness of the vessels of the eye, flushing in the face, and on dissection the vessels of the brain are much fuller of blood than they are found to be in men killed by accidents, which have no effect upon the brain.

Both these species of delirium generally begin towards the end of the first week of the disease, but prevail principally in the second week. In the second species, taking away blood by opening the external jugular vein, and letting five or six ounces of blood flow out, has diminished the delirium considerably, sometimes has carried it off entirely, and with it the whole fever. The same effects have been produced by applying two, or three, or four leeches, and allowing them to fall off of themselves, and afterwards applying cloths moistened with
warm

warm water, and allowing the wounds to bleed for four or five hours. This last method is more efficacious. In such cases of delirium, therefore, it is proper to take away a small quantity of blood. The quantity of blood to be taken away should be according to the strength of the patient; if his strength be much diminished by the fever, or otherwise, the application of one leech to each temple is of considerable use.

Taking away blood from the arm, or any other part of the body distant from the head, is of no manner of use, as the author has seen in a great number of cases. It was much the practice about the year 1760, to take away blood from the arm in cases of delirium of both kinds, the practitioners believing that delirium arose from inflammation of the brain; but the author never saw any advantage arise from this practice.

In delirium of the first kind, where there does not appear any symptom of fulness of the vessels of the brain, the author has not seen any advantage gained by taking away
blood

blood in any way from the head, or from any other part of the body.

At the beginning of fever, it happens sometimes that very violent pain takes place in the forehead, which feels to the patient as if it affected the integuments of the cranium, and were merely external. In this case the author has seen three or four leeches applied to the temples give considerable relief to the patient by removing the pain, and sometimes they have carried off the whole fever.

The author cannot conceive in what way such evacuation from the vessels of the head should be of use, when taking away blood from a distant part of the body is of none. Every man versed in anatomy must know, that from whatever part of the body blood is taken, it is the same blood, excepting for the difference there is between arterial and venous blood, which are to be converted the one into the other in a few seconds.

The vessels of the exterior part of the head have very little connection with the

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vessels

vessels of the interior parts, so that taking away blood from the temples by means of leeches can have very little influence on the circulation of the interior parts. The reason why such topical evacuations by bleeding carry off or diminish the delirium or pain in the forehead, or even sometimes the whole fever, is wholly unknown to the author. The only thing that he knows with regard to it is, that it is often effectual, which was long ago taught to him, and which he has found confirmed by repeated experience.

In this case, as well as in the application of all the remedies employed to carry off or relieve fever, the effect is uncertain. Sometimes this topical evacuation is of very great advantage, or evidently carries off the fever without occasioning any of the appearances which take place in the ordinary crisis of the disease, and not unfrequently it has no effect at all. As so small an evacuation can hardly be of any disadvantage to the patient, it is worth while to employ it in the cases which have been enumerated.

The

The most conspicuous appearance, which takes place in the crisis of fever, is profuse sweating. Whatever substances, therefore, tend to produce profuse sweating suggest themselves as remedies proper for carrying off the disease. Spices are among the substances which tend to occasion profuse sweating, and have therefore been conceived to be proper remedies for carrying off the disease.

The great depression of strength, and great sense of coldness, which take place at the attack of fever, and when the coldness is gone off the great depression of strength which continues, suggest the propriety of employing such powerful stimulants as pepper, cinnamon, nutmegs, capsicum, &c. to prevent the patient from sinking under the disease.

The impression made by the appearance of weakness in the patient, and by seeing the fever carried off by a crisis in which profuse sweating takes place, has determined all nations in the beginning of medicine

to employ such powerful stimulants as the spices enumerated, or the most powerful they could procure, to produce a crisis; practitioners have also employed them to support the strength of the patient. It is not till medicine has subsisted for a long time in any country which has had no communication with others, or until the practice of other nations who have had much longer experience in medicine has been communicated to them, that such stimulants have been thrown aside, or the cool regimen, as it has been called, has come into practice.

It is moreover to be observed, that many practitioners in medicine have been nearly or totally without that education, which could teach them the knowledge of the experience of those practitioners who went before them, and in consequence on what ground the practice of medicine is founded. Unfortunately, in all the schools of medicine, the professors have been more anxious to infuse into the minds of their pupils some hypothesis, rather than a true history of the diseases

diseases they have treated of, or the efficacy of the remedies which have been employed.

It is not therefore at all to be wondered at, that the application of spices, and other powerful stimulants, should often be re-introduced. The same depression of strength, which originally brought spices and other such stimulants into practice, and the profuse sweating which takes place in the crisis of the disease, have made untaught and unexperienced practitioners fall into the same train of thought, and the same practice that prevailed in the rude state of medicine, that is, to keep up the force of the patient, or to bring on sweating, supposing by that means to occasion a crisis in the fever. This is called the warm regimen, and has been thus brought forward repeatedly.

For the same purpose the patient has been kept in an air of a very warm temperature, and covered with bed-clothes that are bad conductors of heat, and with the same effect.

It has been already shewn, that stimulating the body when there is depression of strength, but not actual weakness, is a means of exhausting the powers of the system instead of increasing them. It remains to be enquired whether sweating, produced by simple stimulants, or keeping the patient in a warm atmosphere, or loaded with clothes, will produce a crisis or carry off the disease.

Sweating alone does certainly not carry off a regular continued fever. Every practitioner, who has seen a moderate number of patients afflicted with regular continued fevers, must have observed sweating frequently take place without carrying off, or even producing the smallest alleviation of the disease.

In the crisis of fever, there is not sweating alone, but a universal increase of the secretions. The tongue becomes moist, the crust covering it is exfoliated; a laxity takes place in the intestines, sometimes a considerable purging; the skin regains its healthy

healthy appearance, and is no longer contracted upon the muscles; a relaxation every where takes place. None of these other appearances happen when sweating is produced by stimulants, or keeping the patient in a warm atmosphere, or covered with clothes, non-conductors of heat: on the contrary, the mouth becomes more parched and drier, and the thirst is increased; the intestinal canal is more constipated; the patient is far from being relieved from any part of the disease.

If therefore the attempt to carry off the disease by stimulating by means of the remedies enumerated, or keeping the patient hot, is viewed in any light, it is to be totally rejected.

It happens not uncommonly in the human body, that a muscle contracts without any volition in the man, or even against and contrary to his will, and when there is no apparent stimulus applied either to the part itself, or to any other part of the system. Although this contraction is often, in a

very great degree, yet the two ends of the muscle cannot be brought nearer each other, because it is counteracted: in this case the body of the muscle generally swells, and occasions pain to a violent degree. This contraction has been called spasm.

This kind of contraction takes place not only where there are evident muscular fibres of a red colour, but in all the other parts of the body which have a power of contraction similar to muscular contraction, and not at all depending on their elasticity. For example, the gastrocnemii muscles of the leg contract without any volition or against the volition, and without any stimulus being applied; the belly of the muscles swells, and is extremely painful; so in like manner the skin contracts upon the interior parts, and produces an uneasy or painful sensation without the patient's volition, and when no apparent stimulus is applied.

That there is some cause for such contraction taking place there can be no doubt, but it is a cause that is imperceptible.

Such

Such contractions are called spasm, properly and strictly speaking. Contractions which arise from stimuli, applied either to the part itself or to some other part of the body or from affections of the mind, have been called in a vague sense spasms likewise.

The contractions which, strictly speaking, are called spasms, sometimes last for a very short time, not above a minute or two, and then go off; sometimes they continue for a more considerable length of time, and produce affections of the system which have been fatal. The spasm of the muscles of the leg for instance, which is called the cramp, does not last above a minute or two; it goes off, leaving a degree of soreness behind. A spasm of the annular muscular fibres of the intestines continues for two or three days; it produces extreme pain in the part, and a more frequent contraction of the heart, and in consequence more frequent pulsation of the arteries, so that they often beat more than one hundred and twenty times in a minute. A great depression of strength in the whole system comes
on,

on, a loss of appetite, difficulty of respiration, and derangement of all the other functions of the system take place ; sometimes the effects prove fatal in a few days, or even hours.

It has already been shewn, that in fever there is contraction of the parts which have muscular power generally, and that fever often arises from causes perfectly unknown. Here is, therefore, a contraction in certain points similar to what is called spasm ; some practitioners have, therefore, considered fever as a spasmodic disease, and the whole of it as consisting entirely of a spasmodic contraction of all the parts of the body which have a power of muscular contraction totally independent of their elasticity.

It is to be remarked, however, that contractions of the various moving parts is but a part of the disease ; there is, besides this contraction, a depression of the powers of the body. This arises even before there is any appearance of contraction, and in many cases it is by no means in proportion either
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to the degree or universality of the contraction. This depression continues in many instances when the contraction in many parts of the body is gone off. There is likewise a regularity in the attacks, hot fits, and crisis of the disease, not at all similar to what happens in those contractions which are called spasmodic, these being almost always vague and irregular.

There are certain remedies which, being applied to the stomach or skin, or some other parts of the body of a patient affected with spasmodic contractions, in many instances will immediately carry off the spasm. In a spasmodic contraction of the muscles of the calf of the leg, æther poured upon the skin of the leg will, in some cases, immediately carry off the contraction.

It is to be remarked with regard to these medicines, that they have something peculiar in taste and smell, which we have not sufficient words to express; indeed we have few words to express the sensations
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which we receive from the taste and smell. These sensations are at least, at first, what we call fetid to the smell; their particular odor has given a distinction to these remedies.

Those which we commonly call antispasmodic, are some plants of the natural class of ringent flowers, by Linnæus, called didynamia gymnospermia, such as *mentha pulegium*, &c. Some of the natural class of umbelliferous plants, which come under the pentandria digynca of Linnæus, as *ferulla assafoetida*, &c. some plants which have compound flowers, most of which are contained in the syngenesia of Linnæus, as *matricaria*, &c.; some medicines, the product of chemical processes, such as æther, &c.; some found in animals, as musk, &c. Most of these have been used to take off spasmodic affections, and several of them have been used in fever, with a view of taking off fever immediately, or gradually diminishing the disease.

It has been already said, that æther and oleum vini, dissolved in alcohol, sometimes produce sleep, in which sleep a crisis of the fever now and then takes place, and the disease is entirely carried off; but this has been sufficiently treated of in the first part of this dissertation.

Resinous substances, such as galbanum, sagapenum, oppoponax, &c. have sometimes been made use of, but rather as laxatives, than with a view of carrying off the disease. Assafœtida, gum ammoniac, procured from the same class of umbelliferous plants, though they have been much employed as antispasmodics in other diseases, yet as far as has come to the knowledge of the author, they have not been made use of with a view of carrying off or diminishing fever.

Musk has been employed, in many cases, towards the end of a regular fever, where the strength has been much diminished, with a view however rather of stimulating and keeping up the strength of the patient, than
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as a medicine applicable to the carrying off or alleviating the fever itself: it certainly, as far as the author can judge from frequent experience, has been of little use in either supporting the strength or alleviating the disease.

Castor has been employed in many instances, but especially along with small doses of opium, as has been described in the former part of this dissertation. The author thinks he can say, from his experience, this has been done with very considerable advantage in assisting the opium in producing a degree of stupor and sleep, so as considerably to alleviate the disease.

Camphor, a very peculiar substance, produced by the crystallization of the essential oil of the *laurus camphorifera*, and found often in cavities formed by the cracking of the tree itself, has been very much used, particularly in the second and third weeks of a regular continued fever.

This substance has been so much and so universally employed by the very first practitioners

tioners in medicine, by those of the greatest skill as well as of reputation, that the author's practice can be put in no competition with their opinion. There are many things, however, that make him dubious of its efficacy, either in alleviating or carrying off the disease. In the first place, he has frequently employed and omitted it throughout the second and third weeks of a regular continued fever, in similar cases, without observing that the fever was more alleviated in the patients who made use of the camphor, than it was in those patients who did not make use of it.

In the second place, the dose which has been commonly employed in what is called the camphor mixture, cannot possibly amount to two grains, whereas the author has frequently exhibited to patients in regular continued fevers upwards of ten grains, and to patients in other diseases twenty, forty, and even sixty grains of camphor, without producing in most cases any sensible effect. Sometimes indeed when given in the quantity of thirty grains and upwards, it has occasioned a little giddiness and stupor,

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which

which however have soon gone off. He does not think, therefore, that in so small a dose it can be very efficacious.

Again, in a fever which is running on for two or three weeks, and in which no efficacious medicines have been employed with success, but the disease has gone on in its ordinary course, the flavour of camphor gives the appearance of the practitioner's doing something efficacious, or at least attempting to do something while he is regarding the progress of a fever pursuing its ordinary course. It is wearisome to the patient, as well as to the by-standers and to the practitioner, to conceive that no remedy having any efficacy can be exhibited. This, the author suspects, has been the cause that camphor has been exhibited; its flavour, however, often disagrees with the patient's stomach, and produces sickness or nausea that prevents him from using food of sufficient nourishment.

The author has all along considered a regular continued fever to be similar to a regular

gular intermittent, consisting of ephemeræ following after each other at certain periods of time. He has said that the difference between an ephemera and an intermittent is, that an ephemera consists of one attack of fever only, while a regular intermittent consists of several paroxysms of fever following after one another, one paroxysm going off entirely, before the next paroxysm begins to take place, and the patient appearing in the intervals of the paroxysms nearly or entirely in perfect health, as far as is sensible to the practitioner or the patient.

He has also said, that the bark of the cinchona being exhibited during the interval between the paroxysms of a regular intermittent, has a power of preventing a fresh paroxysm from making its appearance, so that the patient shall continue in perfect health. He has said also, that the difference between a regular intermittent and a regular continued fever is, that the paroxysms of the intermittent are terminated by crisis, but that in a continued fever a new accession takes place before the crisis of

the former paroxysm begins. If it be true then that a regular continued fever differs only from a regular intermittent in the paroxysm of the continued fever not having reached the period of a crisis before a new paroxysm takes place, it might be supposed that if a sufficient quantity of the bark of the cinchona was exhibited during a previous paroxysm of the fever, that it would prevent the next paroxysm from taking place, and give time for the present paroxysm to reach its crisis, or gradually subside.

This reasoning is so obvious, that many practitioners have given large doses of the bark of the cinchona with a view of preventing another paroxysm from taking place in a regular continued fever, and so carrying off the disease. Many practitioners have likewise exhibited it, without any other reason than that if the bark of the cinchona cures an intermittent fever, it ought also to cure a continued fever. Both these sets of practitioners have employed the bark of the cinchona in powder to the quantity of one, two, or three ounces in twenty-four

four hours, and in several instances with success. The fever in this case sometimes has been carried off with an evident crisis, happening later than the crisis of the paroxysm in which it was given would have taken place, and the fever has not returned, or the symptoms have gradually disappeared in less than forty-eight hours, and the patient has been restored to health.

When a young practitioner has succeeded with any medicine in carrying off a disease once, he always expects to succeed; as Sydenham observes of himself when he employed the juice of the *spina cervina* in dropsy. In like manner, the exhibition of the bark of the *cinchona* having succeeded in some cases in carrying off a continued fever, these practitioners have been warm in their recommendation of it in all cases of the disease; after a little time, however, most of them have left off the practice, finding it far from succeeding always. If it had even succeeded sometimes, without any detriment to the patient, they would not have been prevented from employing it, especially

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when they had committed themselves by testifying its efficacy in the strongest terms.

The author has seen many cases in which it has been employed in a regular continued fever, sometimes with success, but it has much oftener failed of success. Where it has failed, the relaxations which began to take place in the disease have been much diminished, the pulse has become more frequent in the morning, the head-ach more considerable, the skin drier, the tongue covered with a thicker fur, the costiveness greater, if the patient was not thrown into a purging, the oppression upon the precordia greater, and likewise the difficulty of respiration increased. On the following evening the head has also been much more affected, that is, the confusion and delirium have been much more considerable, and the patient altogether worse than he probably would have been if no remedy whatever had been exhibited, and there has been less chance of crisis in the fever, and it has been longer of being worn out.

In a regular continued fever, therefore, the bark of the cinchona seems to have a greater chance of doing mischief than good, if it be employed in large doses, so as to attempt to carry off the disease at once. In certain irregularities of continued fever, it may be adviseable to employ it with a view of preventing the subsequent attacks of the disease, or in smaller doses, so as to support the strength of the patient, but these considerations will be the subject of a future dissertation.

The author has now enumerated the several classes of medicines which have been employed to terminate a fever sooner than it would be terminated in its ordinary progress, or alleviate the disease, so that it shall go through its progress with less danger to the patient, by rendering the symptoms less violent, excepting some few which he hardly thinks worthy of notice. Small doses of cerussa acetata were employed by Gaubius, and other medicines have been recommended by other physicians, which have never, as far as the author

knows, come into general practice in any country, or have been useful.

The author has now pointed out the appearances which take place at the beginning of a continued fever, shewn those that take place during the course of the disease, at what time, and how they take place, and how they continue until the disease destroys the patient, goes off by crisis, or wears itself gradually out. He has also endeavoured to point out what attentions are to be paid to the patient on leaving the disease to pursue its ordinary course. He has also endeavoured to shew those means which have been employed to shorten the disease, so as to restore the patient to his pristine health, without leaving it to terminate itself by a crisis; or wear itself out.

One thing, however, is still left. The author has said, that in a regular continued fever there is always depression of strength, and that depression of strength sometimes rises to such a degree as to occasion putrefaction of the fluids. This is certainly not the case in the greatest number of regular continued

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nued fevers, and does not happen perhaps once in an hundred cases of the disease in all its forms and varieties. The author, however, could not pass over this symptom in describing regular continued fever, because, according to his opinion, this appearance of putrefaction always depends upon depression of strength ; he therefore has described the appearance of putrefaction, and shewn that if it did take place, it endangered the life of the patient in the manner which has already been pointed out.

As therefore symptoms of putrefaction have been described as taking place from depression of strength, a constant part of fever, and when this depression of strength takes place in such a degree as to produce putrefaction of the fluids, the putrefaction endangers the life of the patient, it is necessary to enquire what means may be employed to prevent or remove this symptom, or counteract it so as to preserve the life of the patient.

All animal solids and fluids, which are employed for any of the purposes of life,

consist of a solid substance combined with water. This solid substance the author has called by the generic term of animal mucilage; and this acceptation of the term mucilage has now, at least in this country, Great Britain, been almost generally adopted,

There are fluids contained in animals, which have either no mucilage in them, or such a small quantity, as to be in no proportion worth attending to, not in the quantity of an hundredth part of the whole. These, however, are all excrementitious fluids which are no longer useful, and which are in their way to be evacuated,

The mucilages which form the solids and fluids along with water, which are employed in the living body, have various properties,

Some combine with water so as to form solids, such as the mucilage of the membranes, fibres, and cartilages of the body; some combine with water so as to form fluids, such as the mucilage of the serum,
coagulable

coagulable lymph, bile, &c.; some are perfectly colourless, insipid, and inodorous, such as the true skin, the serum, &c.; some are coloured, such as the mucilage of the bile, which is yellow, and the mucilage of the red particles of the blood, which is red; some have a taste, as the mucilage of the bile has a bitter taste. All these properties remain perfect while the different mucilages are performing their offices in a living body.

If any of these mucilages be taken out of the living body of an animal, and allowed to die instead of retaining the properties that they had while in the body and alive, in a short time these properties are by degrees altered and lost, and the matter of these mucilages acquires new properties totally different from those that they had during the time that they formed a part of the living body.

When either a solid or a fluid is taken out of a living body, there are several circumstances to which it is exposed which are different from those from which it was in
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when it was in the body of a living animal, besides that it can no longer now be considered as alive. It may then be owing to some of these circumstances in which the animal mucilage is placed, when out of the living body, independent of its losing its life, that such change in its properties may arise. It is therefore to be enquired, whether these changes which take place in the properties of an animal mucilage, when taken out of the body and deprived of life, arise from its being merely deprived of life, or from the other new circumstances into which it is put.

Certain animal mucilages, on being deprived of life, lose many of their properties which they had when they were alive, as soon as the life ceases in them. All the solid parts of an animal which are capable of contracting, so as to become shorter than they would be if they were not alive, are constantly contracted to a greater degree when alive, than they would contract from their elasticity. This contraction ceases when they are dead; they are always, therefore, longer in a dead body than in a living body, even when they retain all their chemical

mical properties ; (that is to say, the properties that distinguish them from any other species of matter) as well as their mechanical properties. This proposition admits, however, of some abatement ; a solid, capable of contraction when an animal is alive, and exerting that power of contraction so as to become shorter, requires a greater force to break it, than if it was not to exert its power of contraction ; for it contracts by its particles coming nearer one another in the direction in which it contracts, but it breaks by its particles going to a greater distance from each other in the same direction ; but particles cannot come nearer each other in one direction, and go to a greater distance from each other in the same direction in the same instant of time ; therefore the power which the particles exert in coming nearer each other, in consequence of being alive, will resist any power which endeavours to draw them to a distance from each other whatever it may be, or in other words, a living moving part, by its constant contraction depending upon life, will resist any mechanical power which attempts to break it.

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As thus the mechanical properties of a living solid differ in some respects from those of the same solid immediately upon its death, so likewise the chemical properties of living solids or fluids, considered as alive, or as acted upon by the living solids contained in them, differ from the chemical properties that they have immediately upon their death. If a certain quantity of kali purum, a scruple for instance, be applied to any living solid in the body, it will unite with a certain quantity of the mucilage of the solids, and form a saponaceous substance, perhaps half a dram; if the same quantity of pure kali be applied to the same solid just when it has lost its life, it will unite with a much larger quantity, perhaps a drachm; it will therefore combine with a larger quantity in the dead than in the living body.

The mucilage of the coagulable lymph, contained in the blood-vessels, is either alive itself when so contained, or acted upon by the living blood-vessels, and is in consequence perfectly soluble in water; if it be
extravasated

extravasated into any cavity of the body, or if it be thrown from the blood-vessels out of the body, although in all other sensible circumstances it be in the same situation as it was in when it was contained in the blood-vessels, it becomes insoluble in water, separates from the water in which it was before dissolved and becomes solid, or, according to the ordinary term, coagulates.

It is not therefore strictly true, that the solids and fluids of a living body retain exactly the mechanical and chemical properties which they had when alive the instant they die. There are some processes which do not go on in animal mucilages when alive, in whatever circumstances they are, which go on under the same chemical circumstances when the same animal mucilage is dead.

When an animal mucilage is alive, it continues fluid or soluble in water, or not soluble in water, so as to form a fluid or a solid with the water with which it is combined, of an equal degree of softness or firmness if it be a solid, and with an equal
degree

degree of adhesiveness or limpidness. If it be a fluid ; it continues of the same colour, taste and smell. The moment that it dies, it loses those mechanical and chemical properties ; a mucilage, therefore, is not acted upon by the same mechanical and chemical laws when alive, as when it is dead.

As soon as an animal mucilage dies, it becomes subject to various chemical changes, when put under certain circumstances, to which it was not subject when alive. One of these processes is known by the name of putrefaction. If a dead animal mucilage combined with water, so as to form a flexible solid, is placed in a heat between 45 and 150 degrees of Fahrenheit's thermometer, putrefaction begins to take place ; this happens most readily in a heat of about an hundred degrees, if the mass be moderately exposed to the air of the atmosphere, and particularly that part of it which is called pure or respirable air.

The appearances which take place in a dead solid under these circumstances are, that
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the whole of it loses its firmness, that is, it is pulled to pieces with less external force; it feels more clammy to the touch, and if it be washed with water heated to about fifty or sixty degrees, a part of it dissolves in that water.

If it be the red particles of the blood, they become of a darker red colour after standing for some time, and upon examining them with a microscope, some of them appear broke into two, and look like half moons, and sometimes into several pieces like other sections of a sphere, and some appear still spherical, but of less diameter, and by degrees dissolve in the serum, giving it a reddish colour. They likewise redden the mucilage of the coagulable lymph. If the coagulable lymph be extravasated, or remains in the large vessels of animals after they are dead, it coagulates into a very firm substance, which by putrefaction becomes easier to break down, has a clammy feel, and part of it is rendered soluble in water, so as to form a fluid. The mucilage of the serum which, when it is taken out of the
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living body coagulates, if heated to one hundred and sixty-five degrees, into a firm solid mass, when it undergoes this process, if heated to that degree, it coagulates into a looser mass, and some of it not at all. Similar changes take place in the other mucilages of the body when putrefaction just begins.

In like manner, the other fluids of the body lose the properties which they had before putrefaction began.

If the putrefaction continues, the changes which take place do not happen in the whole matter which is to putrify at once. In the first stage, the whole of a solid fibre does not at once become soluble in water, so as to form a fluid, but part of it becomes soluble in water, and the other part remains without changing its properties in the least. In like manner, the whole of the red particles of the blood are not broke down into smaller particles, but some of them remain quite perfect, and have that form they had when taken from the animal in perfect health,
whatever

whatever that form may be, for their form has been disputed, and has not been agreed upon; in like manner part of the coagulable lymph coagulates perfectly, and another part of it does not coagulate upon extravasation. The serum likewise, in part, coagulates by heat as firmly as if no change has taken place in it, while another part does not coagulate at all. The mixture of the solid fibres, which are become soluble in water, with that part of them which has not changed so as to become soluble in water, being perfectly uniform, gives softness to the whole mass. Thus a portion of all these substances putrify at the beginning of the process; and another portion remains as perfect as it was before.

What has been above observed, is similar to what happens in all fermentations.

When a fermentation begins to take place, it does not take place in the whole mass at once, but in a certain part of it only, in which part a change instantly takes place; while in the other parts, no change whatever has

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happened.

happened. For example; if we have an hundred of the smallest integral parts of sugar dissolved in water, and place them in circumstances in which the vinous fermentation arises, at the first instant of the fermentation one of the particles of sugar is converted into wine, and the other ninety-nine particles remain sugar the same as before any fermentation took place; or, in the first instant of the fermentation, two or more of the particles of sugar may be converted into wine, while the remaining particles of sugar continue the same sugar they were before.

Supposing that the first of these suppositions should be the case, in the second instant of the fermentation, two of the particles of sugar will be converted into wine, and ninety-eight will remain perfectly in the form of sugar, and so by degrees the whole sugar will be converted into wine when the fermentation is finished, but during the progress of it there will be a certain quantity of sugar, and another quantity of pure wine.

This

This is proved by taking the mass of mixture of sugar and wine, at any time during the progress of fermentation, distilling it until the whole alcohol is carried over. Afterwards separate the alcohol from the water so as to render it pure, and measure or weigh it. To the liquor remaining in the still, add a little quicklime, and mix a portion of whites of eggs; then expose the mass to a degree of heat sufficient to coagulate the whites of eggs; throw the whole through a filter; evaporate and crystallize; the sugar in it will be found the same sugar, that was subjected to the fermentation, and its quantity will be in the inverse proportion of the alcohol obtained. If there be half the sugar, there will be a certain quantity of alcohol; if there be a quarter of the sugar, there will be half as much more of alcohol, as is well known to those who form vinous liquors for distillation.

It might happen that the whole of the mucilage which, with the water, constitutes

the coagulable lymph, might by putrefaction at once become soluble in water, so as to make a fluid solution; that the whole red particles of the blood might become soluble in the serum, so as to form a dark reddish fluid; that the whole of the mucilage of the serum might lose the property of becoming solid when exposed to a heat of an hundred and seventy degrees of Fahrenheit's thermometer, and yet no further change should take place.

It might happen in like manner, that the other mucilages of the body might only lose the properties that depended upon their solubility in water, and still retain their other qualities.

This, however, does not take place, if any dead substances continue to be exposed to the circumstances of putrefaction which have been enumerated, whether they were colourless, or of whatever colour they were in the healthy living body, they gradually assume a brown colour, which increases
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until it becomes of a shade so deep as to be conceived to be black.

In the progress of this process, substances begin to be extricated, which are vapours in the heat and pressure of the atmosphere.

One of these vapours has a fetid smell, very similar to the smell of a compound of inflammable air and sulphur. This smell has commonly been called a putrid smell, but experiments have not been made to determine whether it be actually a compound of inflammable air and sulphur or not, as far as has come to the knowledge of the author.

Another vapour extricated in this process is gas, whose synonyms have been already pointed out, viz. fixed air and carbonic acid; another vapour is pure inflammable air, which does not appear till the end of the process.

The mucilages are partly converted into these vapours, but at last there begins also to be found in the mass, if examined, nitrous acid and muriatic acid, combined with lime and ammonia, and towards the end of the process calcareous earth and ammonia, combined with gas.

All these things have been ascertained by experiment; it has been conjectured that clay is also produced.

Although the mucilages undergo these changes in the body of a dead animal, when kept in the same chemical circumstances in which they were in the body of a living animal, yet there are certain means of preventing them from going through the putrefactive fermentation after the death of the animal. In the first place, no such change will happen, if they be placed in such a degree of heat as will freeze the water contained in them; secondly, this change will not happen in the heat of two hundred and twelve degrees, or even in a heat somewhat below that degree, though that
degree

degree of heat in which putrefaction will not take place from the heat being too great, has not been exactly ascertained. In the third place, if no pure air whatever touches such animal mucilage, no putrefaction will occur in them. In the fourth place, although air should touch it, if a certain pressure is made upon it by condensing the vapours surrounding it to a very great degree, putrefaction will arise much more slowly, though it is not ascertained that there is a degree of pressure which will prevent putrefaction from arising altogether. Fifthly, if the whole water be separated from the mucilage by evaporation, no putrefaction will take place in it. Sixthly, if the water be separated from an animal mucilage by its coagulating in consequence losing its life, or if it be coagulated by heat, or by certain substances applied to it which have this effect, and if the water be afterwards squeezed out from it; when in any of these ways mucilage is separated from water, and rendered insoluble in water again, the more perfectly it is separated from the water with which it was

combined, and the more perfectly it is rendered insoluble in water, the more difficultly the putrefaction will happen ; and, if it be perfectly separated from the water, no putrefaction will take place. Seventhly, although a dead animal mucilage be kept in a heat in which it would putrify most readily, which is nearly that of the human body ; if it be exposed to a proper quantity of pure air for putrefaction, as it is also in the human body ; if the air in which it is contained is neither too rare or too dense to allow putrefaction to take place properly, as it is not in the human body ; if it has a proper quantity of water contained in it ; and if its water be not separated by evaporation or by tanning, neither of which happen in the human body without killing the part ; if it should be in all these circumstances in which putrefaction takes place most readily in dead matter, yet if such animal mucilage should be kept immersed in an acid of any kind, or in an alkali, or in a metallic salt, or in gas, or in several other substances, it will not putrify. It is to be observed, however, that the quantity of these substances which
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are applied to it, to prevent it from putrifying under these circumstances, must bear a certain proportion to the whole of the mucilage, otherwise they will have no such effect. Let a drop of vitriolic acid be applied to an hundred weight of animal mucilage, and equally applied to all of it, putrefaction would certainly not be prevented. There must be then an adequate proportion of such antifermentative antiputrescent to produce any sensible effect; certainly sixty grains of concentrated vitriolic acid would have no effect on an hundred pounds of animal mucilage, whether solid or fluid.

Supposing then we could apply sixty grains of vitriolic acid to the human body, which commonly weighs one hundred and fifty pounds, in which all these circumstances of putrefaction are found, we could not expect any sensible effect to arise from it, whether the body be living or dead, and the same thing may be said of all antiputrescent substances.

But

But sixty grains of concentrated vitriolic acid can never be applied to the living human body, excepting it be to the surface of the skin, or rather the scarf-skin; for five grains of concentrated vitriolic acid, and that diluted with water, are as much as can be thrown into the stomach at once, and this cannot be repeated more than six times in the twenty-four hours. The acid so thrown in will be destroyed by the bile and otherwise, and also be evacuated, so that we cannot expect thirty grains to exist in the blood-vessels at once, and certainly we can never get such a quantity into them as to be sensible to any experiment; we cannot therefore apply vitriolic acid, so as to prevent putrefaction in any perceptible degree. The same reasoning may be applied to any other antifermentative antiputrescent, such as any other acid, alkali, neutral salt, &c.

Vitriolic acid is among the most powerful substances for preventing putrefaction in proportion to its quantity. Peruvian bark is also capable of preventing putrefaction in dead animal matter, placed in circumstances

circumstances in which it would putrify, if the Peruvian bark was not applied to it. But while five drops of vitriolic acid may prevent a pound of dead animal matter from putrifying in a sensible degree, in circumstances in which it would otherwise putrify, it will require five hundred grains of Peruvian bark to have the same effect upon a pound of dead animal matter ; now suppose that Peruvian bark gets into the blood-vessels, which is a question, it certainly never could get in in such a quantity as to produce a sensible effect on an hundred and fifty pounds of animal matter ; therefore, taking it in this light, we could not expect to get into the blood-vessels such a quantity of any antifermentative antiputrescent, as to prevent the animal body from putrifying, if it were not prevented by the effects of life.

Since the mucilages of the body of a living man are in all the circumstances most proper for putrefaction, *i. e.* they are in the most proper heat, are exposed to be acted upon by a moderate quantity of pure air,
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are combined with a proper quantity of water, are in motion, remain often without change during a time they would putrify in, if they were in the same circumstances in a dead body, and have nothing in them which prevents them from putrifying when dead, it must be concluded that the life only prevents them from putrifying, or in other words, that it is as much a property of living matter not to putrify, as it is of dead matter to putrify. Since then nothing can be applied in such proportion to them as would prevent them from putrifying if dead, so nothing can be applied in such proportion as can prevent them from putrifying when alive.

Taking the argument in another view, it may be true that such a quantity of vi-
triolic acid, or any other antiputrescent anti-
fermentative may not be able to get into
the body, as to check putrefaction, yet the
living power of the body, although dimi-
nished, would in some degree still prevent
putrefaction from taking place. Anti-
fermentative antiputrescents might sup-
ply

ply the loss of the living power, so that the remaining power of the life, together with the antiputrescent power of the anti-fermentative, might be sufficient to prevent any putrefaction. The very small quantity of the anti-fermentative that can be applied in proportion to the mass of matter that it has to work upon, makes it extremely improbable that it would, even taking the argument in this view, at all retard putrefaction.

A certain degree of putrefaction of the fluids, in a living and otherwise healthy body, may be brought on by a person's eating salted animal food with farinaceous matter. This degree of putrefaction is a disease which has been called sea scurvy, although it happens equally at sea or on shore, when such food is made the only nourishment. In this case, depression of strength is the first symptom of the disease, which arises evidently from food disposed to putrify, for if the patient lives on food not disposed to putrify for two or three weeks, the depression of strength, the appearances

pearances of putrefaction, and the whole disease are carried off.

In this case, neither vitriolic acid, nor Peruvian bark, nor any other antifermentative antiputrescent, has any effect in taking off the putrefaction, though they can be applied to the food in the stomach, and can therefore act upon it in a much larger proportion than they can do on any of the other solids or fluids of the body.

It is only native vegetable acid, and the looser vegetable substances, which we commonly call greens, which are capable of being digested themselves, and in their digestion rather tend to become acid than to putrify, that carry off the depression of strength, the appearances of putrefaction, and the whole disease.

When putrefaction of the fluids therefore arises solely from the depression of the powers of the body from using improper food, antifermentative antiputrescents have no power of the preventing putrefaction.

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We can therefore have little expectation of their preventing putrefaction arising from depression of strength taking place in fever; neither are vitriolic acid, Peruvian bark, &c. found actually to prevent putrefaction, when it arises from the depression of strength in a violent fever.

Moreover it has been conceived, that not only putrefaction might be prevented when it arose in the solids and fluids of the body, but likewise that the parts that had already undergone putrefaction to a certain degree, might be made to return again to that sound state from which they became putrid.

If animal solids putrify, the first appearances are, that they acquire an adhesiveness to other substances greater than they had before; they become of a greenish or brownish colour, and emit a fetid vapour, and are more soft and flabby. If they be taken in this state, and diluted vitriolic acid be applied to them, they lose their adhesiveness, become firmer, nearer their colour when
found,

found, and lose their smell. It has been thought in this case, that not only farther putrefaction was prevented, but that the part was re-changed, and brought back to the state it was in before the putrefaction began to take place.

On considering the argument, however, this by no means appears to happen. An acid decomposes the fetid vapour, so as to take off its feter, but it does not re-convert the fetid vapour into the solid from whence it was produced; for if the fetid vapour be collected together after it is separated from the other parts, and an acid is applied to it, no animal solid is produced, though the smell of the fetid vapour is entirely lost.

That the destruction of the fetid vapour is a different process from the solids re-acquiring its firmness, is evident, because the solids may re-acquire their firmness without the feter's being diminished, by applying an infusion of oak-bark to the matter that is become soft by putrefaction.

The action of the infusion of oak bark is in this case upon the part that has not been changed by the putrefaction; that part it coagulates as it always would have done; but upon that part which has already been changed by the putrefaction, it has no effect.

For not only fermentation, but also solution and other chemical processes, do not take place in every particle of the mass that is acted upon, at the same instant, but progressively; that is, first upon one part of the mass, in that part the properties are totally changed; the properties of the remaining part continuing perfectly the same.

Thus, if a piece of lime be thrown into a vessel containing muriatic acid, as soon as it is thrown in, a part of the muriatic acid combines with a part of the lime, and forms a compound, viz. calx muriata, whose properties are perfectly different from the properties of the muriatic acid, or the properties of the lime, the remaining muriatic acid and the remaining lime retaining each its own

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properties,

properties, such as they were before they were thrown into the same vessel; there are therefore, after the first instant of the operation in the whole mass, lime, muriatic acid, and calx muriata.

Again, suppose *ferrum vitriolatum*, a compound of calx of iron and vitriolic acid, be put into a retort, and a receiver be adapted to it, and the retort be heated to a certain degree, the heat separates the vitriolic acid from the calx of iron, but not at once: at the beginning of the operation, a part of the vitriolic acid distills over, a part of the calx of iron remains behind in the retort, and along with it a part of the *ferrum vitriolatum*, not decomposed, but retaining the same properties it had before the operation.

So if a muscular fibre be placed in the circumstances in which it putrifies, the whole does not putrify at once, part putrifies, and is converted into a mucilage soluble in water, and not coagulable; and if the putrefaction go further into fetid vapour,
 &c.

&c. a part also remains coagulable by oak bark. Thus the oak bark renders the part that was unchanged much firmer by coagulating it, but is far from restoring the whole mass to what it was before. The coagulated or tanned part has not now the properties the muscular fibre had before it began to putrify, but is a substance with its properties totally different, excepting in its firmness; the fetid vapours, and other vapours remaining the same as if no oak bark had been applied.

In the cases, therefore, where oak bark, or any such substances have been applied to give firmness to animal substances which have become soft by putrefaction, that firmness arises from the coagulation of the parts yet unchanged by the putrefaction, and not from the parts, which have gone through any stage of putrefaction, returning to their former state so as to have their former properties, and so as to be useful for the purposes which they served in the body before the putrefaction had taken place.

When an acid or any other such substance coagulates, and renders firm a mass which is already putrified in part, it does not restore it to its former state. When it combines with or decomposes the fetid vapours, it does not unite with them so as to produce the substances that were changed into such fetid vapours by putrefaction, nor does it separate these substances from the putrid vapours so as to restore them to their pristine state.

Neither coagulating substances, therefore, nor substances destroying fetid vapours, restore putrid substances to what they were before.

Upon the whole, therefore, no expectation can be had of applying substances in fevers, where there is disposition to putrefaction, from putrifying, by any remedy that will either produce in them, or prevent any chemical process ; much less can there be any expectation of restoring them to their former state, when they have actually putrified, by any such remedy.

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The only means, therefore, of preventing putrefaction in fever are: first, the carrying off the fever by the means already pointed out. When, therefore, symptoms of great depression of strength, such as great loss of muscular power, great oppression about the præcordia, sighing, a feel of softness in the pulse, &c. arise at the very beginning of a fever, a practitioner should be more anxious to produce a crisis by antimonial preparations, &c. Secondly, the avoiding all applications which diminish the force or depress the strength of the system. Evacuations therefore that are unnecessary, as bleeding, &c. should be carefully avoided, the patient should be kept quiet in bed, his mind as much at ease as possible, &c.

If any of the parts of the body have already putrified, the only way by which the putrid matter can be got rid of, is to suffer it to pass through the excretories of the body.

If with strong symptoms of putrefaction of the fluids, an hæmorrhage should take
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place either from the nostrils or mouth, or if blood be vomited up, or if it comes from the lungs, or if purging of blood should take place, or an hæmorrhage should happen from the womb, or if blood comes along with the urine, even if the hæmorrhage should be in small quantities, the patient is in the utmost danger. Should effusion of blood take place in any of these ways, without attending to any thing else, every means should be attempted to stop such hæmorrhage. The most powerful remedy for stopping hæmorrhage arising from laxity or putrefaction, is the bark of the cinchona, which should be given in powder to the quantity of an ounce in twenty-four hours, together with acids and other astringents. The following form, or something similar, may be exhibited:

R. Decoctum corticis cinchonæ libras duas cum semissē;

Rosæ rubræ exsiccatæ unciam dimidiam;
Acidi vitriolici diluti drachmas quinque.

Decoctum fervens rosæ affunde in vase vitreo, dein adde acidum vitriolicum dilu-
tum,

tum et macera, per horam dimidiam. Li-
quorem frige factum cola.

R. Colaturæ uncias duas ;

Pulveris corticis cinchonæ drachmam
unam ; misce fiat haustus quarta quaque hora
sumendus.

Although when hæmorrhage arises in consequence of putrefaction, all other considerations must give way to so dangerous an accident ; other hæmorrhages are not to alter our other attentions during the fever. Sometimes an active hæmorrhage from the nostrils, or another part, carries off the fever in the same manner as an inflammation, although the hæmorrhage be but in a small quantity. If a large hæmorrhage should arise without symptoms of putrefaction, whether it relieves the fever or not, it may be prudent to check it by infusion of roses, prepared according to the London Pharmacopœia, given to the quantity of two ounces every four hours ; but the bark of the cinchona is not to be exhibited, unless it be proper from other views in the disease.

The author comes now therefore to treat of the care of patients in a convalescent state, after a regular continued fever.

If a crisis should arise at the beginning of the first week of a regular continued fever, or before the sixth day, the disease most commonly returns, and becomes an intermittent.

The author must again take notice of the supposition, that there is some matter to be altered in the progress of a fever before it can be expelled from the system, which he has shewn is only supposition, and is unsupported by any experiment, no man having ever seen, smelt, or tasted such matter; it has however been often inculcated, that such matter must be subdued by allowing the intermittent to go on.

If however a crisis should take place in the first week of a regular continued fever, and if the crisis should be perfect or nearly so, if there should be considerable sweating, if the tongue should be clean or nearly so,
if

if there should be a lateritious sediment in the urine, if the costiveness should be gone off, if the head-ach should have ceased altogether, or nearly, if the pulse should be less than eighty strokes in a minute, and tolerably free, the author is warranted from experience to say, that the bark of the cinchona should be given in powder immediately after the crisis, which is commonly about six or seven o'clock in the morning, to the quantity of a drachm every hour, and continued at least for forty-eight hours.

By this practice, it often happens that a return of any paroxysm is prevented, and the patient is freed from the disease.

If the crisis has arisen without the exhibition of any medicine, as the author has supposed in what is said above; if the crisis has been nearly complete, and the bark of the cinchona has been employed as has been represented, and notwithstanding this a fresh paroxysm of fever should return, the case must be referred to what has been said in
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treating of regular tertian intermittents, or will be said in treating of irregular intermittents in a future dissertation.

Supposing that preparations of antimony, ipecacuanha, or any other medicine which has the property of producing symptoms similar to those which arise in the ordinary crisis of a regular continued fever have been exhibited, and that they have actually produced these appearances which take place in such crisis, and there is a freedom from the symptoms of fever equal to that which has already been described, in this case the bark of the cinchona should also be employed as has been described.

Supposing that in the beginning of a regular continued fever there should be much greater pain in the forehead, or over the whole head externally, and that either by applying leeches to the temples, or otherwise making topical evacuations from the head by bleeding, or if in a similar case blisters have been applied in the first days of a fever behind the ears, or otherwise to any part of the head, and the pain has ceased, and all
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the other symptoms of the disease have gone off, although no mischief would undoubtedly arise from employing the bark of the cinchona, yet as far as the author's observation goes, the fever has not returned, though it was not employed.

If in a continued fever no medicine has been employed, and a crisis should take place in the first week of the disease, but that crisis should be very incomplete; that is, though about four or five o'clock in the morning the patient should fall into a sweat, even rather profuse, if there should be a lateritious sediment in the urine, but the head-ach should not be much abated, if the tongue should be still foul, if the depression of strength should remain very great, and the other appearances of fever should still remain without great abatement, it then becomes a question, whether the bark of the cinchona should be employed in large quantities, so as to try to prevent a return of a fresh paroxysm of the fever.

This argument, in the author's opinion, depends on the following circumstances:

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In the first place, this seldom happens in a regular continued fever in which the symptoms of the fever come on slightly at first. If it should, as far as the author's experience goes, it is best to employ the bark of the cinchona in the manner described, for though it often fails in preventing the recurrence of a fresh paroxysm of the disease, yet hardly any mischief arises from it. There is in this case a chance of terminating the fever immediately, so that the patient shall recover his health, for which reason it had better be employed.

In the second place, if a regular continued fever should attack a patient at once with violent symptoms, great sense of coldness followed by heat, returning alternately for twenty-four hours, or until the evening following, and if there should be great head-ach, great depression of strength, anxiety, &c. and no medicine has been exhibited which produces appearances similar to the ordinary crisis of fever; if an imperfect crisis should happen in the first week of the disease; in this case neither the bark of
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the cinchona, nor any other medicine acting in the same manner should be employed. If this should happen, it is proper to employ preparations of antimony, or other medicines of similar effect, in the manner that has been already described ; when it is wished that they should exert their effects in the most powerful manner to carry off the remaining symptoms of the disease.

When the bark of the cinchona has been exhibited, sometimes no fresh attack of the fever has taken place, and the remaining symptoms of the first stage have gradually disappeared ; but much more frequently the disease has returned, and continued as if no such imperfect crisis had happened, and the whole fever has been more severe, or the appearances which have remained have continued and gradually increased, and formed a new fever, which has lingered out for several weeks ; or lastly the patient has been relieved from the fever, but continued in a languid and morbid state for a great length of time.

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This observation is one of the grounds on which the author has formed his opinion, that the bark of the cinchona prevents the return of fever, but does not take off a fever which is present. Preparations of antimony and other remedies having the same effects exhibited in such imperfect crisis in the first week of the disease, often remove the remaining appearances of fever, so that the patient is restored to health.

If, on exhibiting preparations of antimony or ipecacuanha, or any other medicine of the same class, a very imperfect crisis should be produced in the second week of a regular continued fever, the same method is to be pursued as if the crisis should take place when no remedy has been employed.

If no medicine has been employed tending to produce a crisis in a regular continued fever, and a crisis has taken place in the second week of the disease, if the crisis be tolerably perfect, that is, if a considerable sweating should take place in the morning,
if

if there should be lateritious sediment in the urine, if the tongue should become tolerably clean, if some degree of head-ach should even remain, and the pulse should remain frequent even to ninety or an hundred strokes in a minute, and some other febrile symptoms should still continue, the bark of the cinchona should be employed in as large doses as the patient's stomach will bear. The fever is not near so apt to return, or be prolonged, as it is when such a crisis takes place in the first week, and therefore it is better to employ the cinchona, or other medicines of that class, than preparations of antimony, or other medicines which have similar effects.

The same thing is to be said if a crisis has been produced in a regular continued fever by means of preparations of antimony, &c. in the second week of the disease, or if the fever has been carried off in the second week by any other means.

If a crisis should take place on the fourteenth day, or any day afterwards, and the fever should be diminished by it, although
not

not carried off, the appearances of the fever continue almost always to diminish until the disease goes off; it is therefore not necessary to employ any remedy with a view of preventing its return.

The great disposition in a fever to return, if a crisis should take place in the first week of the disease, the less disposition which it has to return if a crisis should take place in the second week of the disease, and the very little disposition which it has to return if a crisis takes place in the third week of the disease, most probably was the foundation of the idea which has prevailed from the earliest practitioners down to the present time, that there was some matter introduced into the body which required preparation or concoction; that is, that it should be in some way altered, in order to be evacuated before a fever could be got rid of. When, however, it comes to be considered that this, though it be a possible explanation of this appearance, is by no means supported by any other evidence, the author therefore does not think it worth while discussing
this

this argument. It would be necessary for him to write a great many volumes to refute the various opinions, which have been admitted into the theory of medicine as true because they are possible.

If a crisis should take place at any time of a fever, purgatives have often been employed with a view of evacuating any part of the matter which occasioned the fever, that may have remained after the crisis had taken place. The author has already said, that there is no reason for supposing any such matter to exist; that it is mere hypothesis; purgatives, therefore, cannot prevent a fever from returning, or any mischief from happening by evacuating such matter. A purgative has no power of carrying off one fluid out of the blood-vessels more than another; it can only contribute, therefore, to the clearing the body of any particular substance, by occasioning a quicker change in the whole fluids. Purgatives would indeed evacuate all those which are at present in the body, so that a fresh set

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of fluids would be formed more quickly. The serum, coagulable lymph, and red blood, and all the healthy fluids, would be sooner re-produced from the food, if those which are now in the body are evacuated by purgatives as well as noxious matter, but it would be long before the change would take place, and the noxious matter got rid of. Supposing there was mixed with the whole blood some extraneous matter, which amounted to an hundredth part of the whole, and supposing that one dose of a purgative evacuated the hundredth part of the whole fluids, it would take more than fifty doses of purgatives to evacuate the half of the extraneous matter, for no experiment has hitherto shewn, that purgatives has any specific power of taking away one matter more than another.

It might be supposed that purgatives would evacuate the more fluid parts of the blood, and therefore would carry off the serum and superfluous water. If this was the case, after purging every day for several

ral days, upon opening a vein, and taking away a quantity of blood, there would be less serum and a larger proportion of coagulum. The contrary of this, however, is found to be the case; there is actually less coagulum, and more serum and superfluous water.

It is commonly believed, when mercury has been exhibited, so as to produce salivation, that by exhibiting a purgative the mercury is carried off, and the salivation made to cease. The author chose forty patients as nearly similar to each other as could be, who had been cured of syphilis by mercury, exhibited so as to produce salivation, and in consequence the salivation was wished to be carried off. To twenty of these he exhibited purgatives, and to the other twenty no medicine whatever; in this case the salivation ceased much sooner, upon an average, in the twenty to whom no medicine whatever had been exhibited, than in the twenty who used purgatives.

It does not appear, therefore, that purging has any power of carrying off any nox-

ious matter remaining after a fever: first, because there is no evidence of such noxious matter existing; and secondly, if such noxious matter did actually exist, there is no power in a purgative to carry it off.

Moreover, purgatives have a considerable tendency to re-produce the disease, or occasion relapses, as the author has seen in many instances, and there are also several instances on record, though not related with that view. For instance, De Haen relates a case, where he says, that a fever returned, though there was a perfect crisis about the end of the second week, although purgatives had been exhibited; in that case, the purgatives evidently re-produced the fever. Purgatives are, therefore, never to be employed after the crisis of a fever, excepting there should be costiveness, and in that case only so as to produce one evacuation.

If a crisis should happen in the first or second week of a fever, the patient is never so much reduced in his strength as to require food of great nourishment. After such a crisis, it is much better to confine him for several

several days to such food as he employed during the fever, especially to avoid all solid animal food, more relapses having been observed by the author to arise from using solid animal food too soon, than from any other cause.

If a crisis should happen in the third week of a regular continued fever, although the patient be extremely weakened by the disease, yet no solid animal food is to be given; for it is to be observed, that the cause of the weakness, the exertions in the fever, have ceased. Very moderate nourishment in proportion to what mankind use commonly in cultivated countries, together with sleep, which in this case is generally easy and refreshing, is sufficient to recruit his strength. He should therefore for many days refrain from solid animal food, the use of which, the author has already observed, he has found more productive of relapses than any other cause whatever.

For the knowledge of the quantity of food which men use in civilized nations more than is necessary, the author begs leave to refer to his treatise on Digestion.

If

If the patient is to avoid solid animal food when a perfect crisis takes place in the third week, although he has been much exhausted, it is much more to be avoided after a crisis has taken place in the first or second week, when the patient is not only less exhausted, but when there is likewise greater danger of a relapse.

If no crisis should take place in the first or second week of a regular continued fever, and if in the third week the fever should gradually diminish by critical symptoms taking place one after another; that is, if the tongue has been covered during the whole of the disease with a mucous crust, and that crust begins to leave the edges of the tongue, or exfoliates in small pieces all over the tongue, or if the tongue has had a raw appearance when moist, and a glassy one when dry, if it begins to be covered with its ordinary mucus, and is putting on its common appearance, if the pain in the forehead is gradually ceasing or entirely gone off, if there be a lateritious sediment in the urine for a day or two, which afterwards ceases, if the skin becomes gradually moist,

or

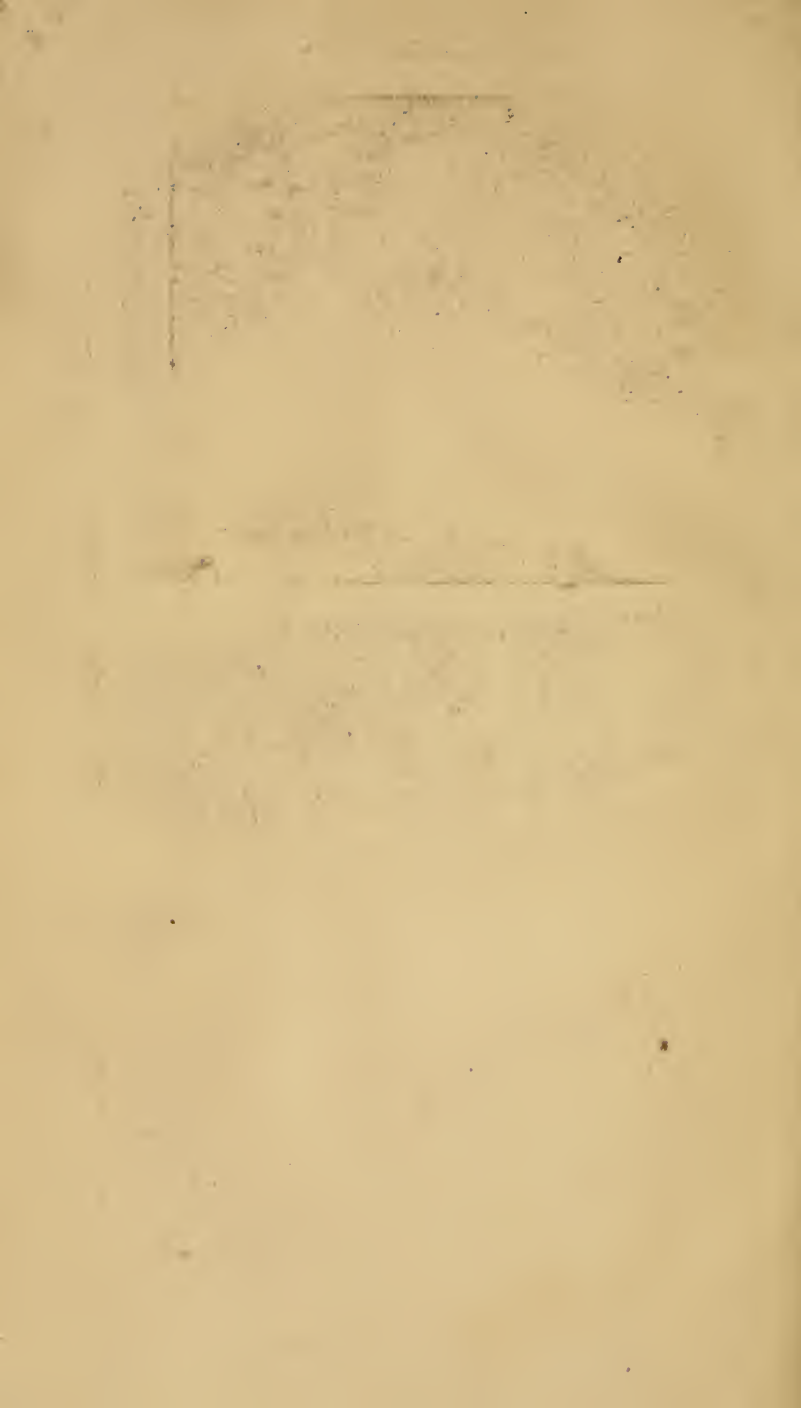
or a slight sweat should arise about four or five o'clock in the morning, if the costiveness should go off by degrees, or there should be some laxity in the intestines, if the pulse should become slow, or if it should fall at once to between eighty or ninety strokes in a minute, if the skin should return gradually to its ordinary colour, if these appearances of crisis should appear after one another, or in a slighter degree at first, and gradually becomes more conspicuous, the patient must be absolutely forbid the use of solid animal food for many days after the fever has begun to subside, or even of any food in too great a quantity, especially at once.

If a crisis should take place in the first or second week of a continued fever, and should be very perfect, the patient should not be confined to bed during the whole twenty-four hours, but should be covered with his ordinary clothing; but if the crisis be incomplete, and several of the symptoms of the first stage still remain, it is better that he should be confined to bed until these appearances go off.

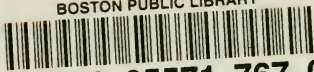
If a complete crisis should take place in the third week of a regular continued fever, or if several critical symptoms should take place, it is better that the patient should be covered with his ordinary clothing, even supposing that he is obliged to lie upon the bed, excepting where the weakness is so very great, that he is apt to faint in being placed in an erect posture, or on any extraordinary exertion.

If the disease should begin gradually to diminish in the third week, when the diminution is become considerable, it is better also that the patient should be covered with his ordinary clothing during the day time.

The next dissertation will take notice of the irregularities and accidents which happen in intermitting and remitting fevers.



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